



RANGELY CARBON DIOXIDE PIPELINE

DRAFT ENVIRONMENTAL
IMPACT STATEMENT

AUGUST 1984

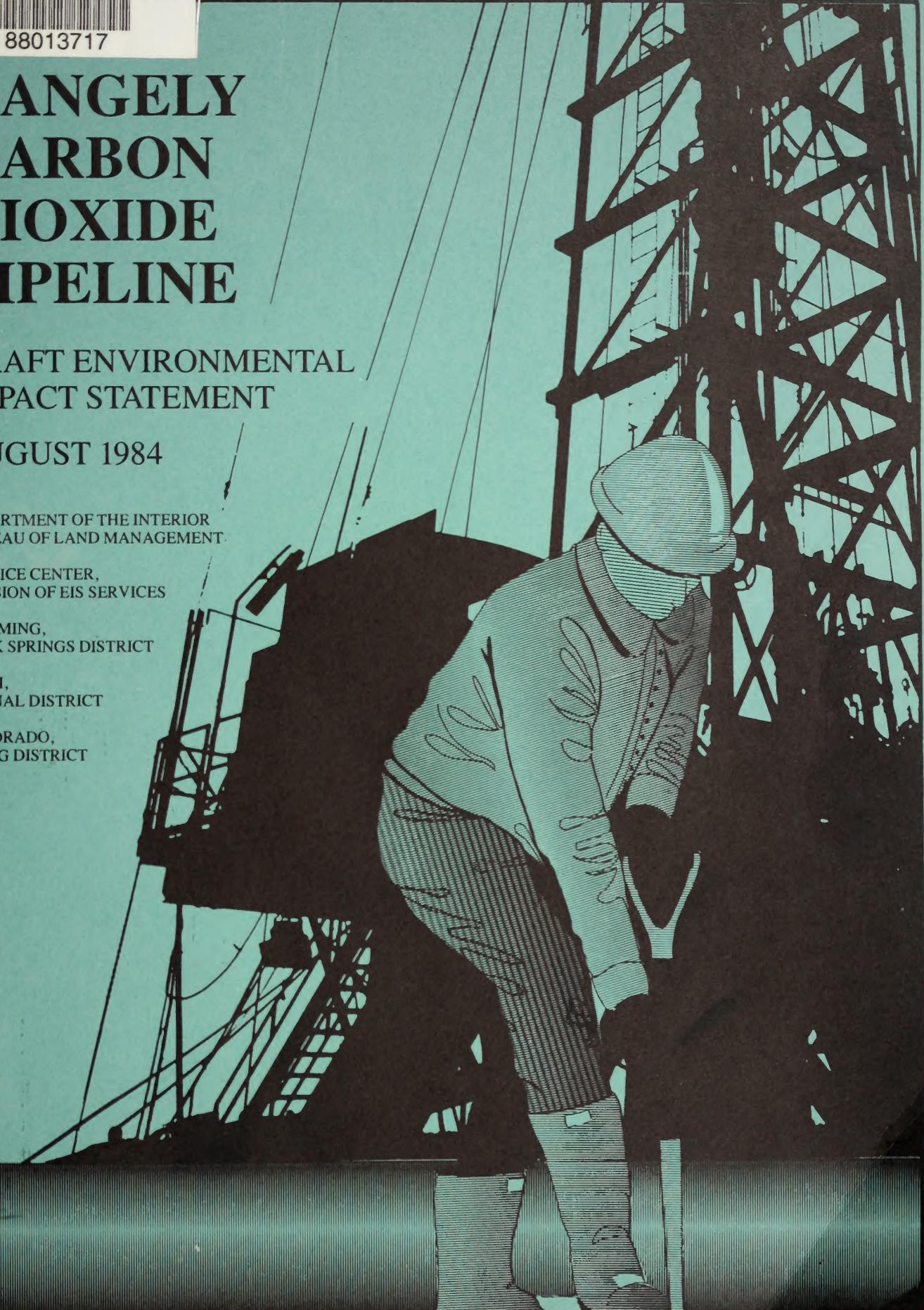
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SERVICE CENTER,
DIVISION OF EIS SERVICES

WYOMING,
ROCK SPRINGS DISTRICT

UTAH,
VERNAL DISTRICT

COLORADO,
CRAIG DISTRICT





IN REPLY REFER TO:

United States Department of the Interior

Bureau of Land Management
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003

1792 (934)
Rangely

JUL 25 1984

Dear Reviewer:

This draft Environmental Impact Statement (EIS) on the proposed Rangely Carbon Dioxide Pipeline project is submitted for your review and comment. Please retain this draft EIS for future reference as the final EIS may only be an addendum.

The purpose of this public review is to improve the impact analyses presented in the draft EIS. We welcome your comments on this EIS. The final EIS will be prepared considering comments received.

Comments on the draft EIS may be submitted in writing. In order to be considered in the final EIS, all comments must be received by October 30, 1984.

Please make your comments as specific as possible. Comments will be more helpful if they include suggested changes, sources, or methodologies. Comments providing only opinions or preferences will not have a formal response, but will be included as part of the decisionmaking process.

At this time no public hearing is scheduled for this EIS. If enough people indicate an interest in having a public hearing, one will be scheduled. If you are interested in attending or presenting material at a hearing, please use the sheet provided for this purpose. Requests for a hearing must be received by September 19, 1984, at the address listed below.

A copy of the final EIS will be sent to all persons who provide comments on the draft EIS or to anyone requesting a copy. Please address written comments, requests for copies of the draft, or requests for hearing to:

Janis L. VanWyhe, Project Leader
Bureau of Land Management
Division of EIS Services
555 Zang Street, First Floor East
Denver, Colorado 80228
(303) 234-6737)

Sincerely yours,

Hillary A. Oden
Hillary A. Oden
State Director
Wyoming State Office
for

There are presently no plans to hold public hearings on the Rangely CO₂ Pipeline Project draft environmental impact statement (EIS) because of the apparent lack of controversy toward the proposed project. Public hearings were held for the Chevron Phosphate Project, which is identified in this EIS as an interrelated project. Because of the similarities between the two pipeline routes and the requirement that they would, in part, be built simultaneously, this EIS addresses the concerns voiced during the Chevron Phosphate Project EIS hearing process.

You are invited to provide written comments on this draft EIS. We are also encouraging you to visit the local Bureau of Land Management (BLM) offices and talk with the Area and District Managers about any concerns.

If this approach seems unsatisfactory, and if enough people indicate a desire to testify, public hearings on the Rangely CO₂ draft EIS can be held at the following locations and times:

Monday, October 15, 1984, 7:00 pm
Holiday Inn
1675 Sunset Drive
Rock Springs, Wyoming

Tuesday, October 16, 1984, 7:00 pm
Uintah County Courthouse
147 East Main Street
Vernal, Utah

If you would like to testify or attend one of the hearings, please return this tear-out sheet, fold as indicated on the back, and mail to the BLM Division of EIS Services. It must be received no later than September 19, 1984 in order to be considered. If enough responses have been received to warrant one or more hearings, a hearing or hearings will be arranged. Information on the hearings will be published in the *Federal Register* and other media sources to give the public enough notice.

Yes, I am interested in testifying at the following public hearing:

Rock Springs, Wyoming

Vernal, Utah

Name: _____

Mailing address: _____

Telephone number: (____) _____

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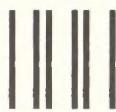
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ENVIRONMENTAL IMPACT STATEMENT
ON THE

RANGELY CARBON DIOXIDE PIPELINE

AUGUST 1984

Prepared By
Bureau of Land Management

Myles Humphrey

Myles Humphrey
Director, Wyoming State Office

COVER SHEET

Rangely Carbon Dioxide Pipeline Project Environmental Impact Statement

(X) Draft
Lead Agency

() Final

U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies

U.S. Department of the Interior
Bureau of Reclamation
Fish and Wildlife Service
National Park Service
U.S. Department of the Army Corps of Engineers

Counties That Could be Directly Affected

Moffat and Rio Blanco counties, Colorado
Daggett and Uintah counties, Utah
Lincoln and Sweetwater counties, Wyoming

Abstract

This Environmental Impact Statement (EIS) assesses the environmental consequences of the federal approval of Chevron USA, Inc., Rangely Carbon Dioxide Pipeline project.

Chevron USA, Inc., proposes to construct and operate a 176-mile-long pipeline that would transport carbon dioxide (CO₂) from Exxon's proposed natural gas treatment plant at the Shute Creek site near Opal, Wyoming to the Rangely Weber Sand Unit oil field in Colorado where the CO₂ would be used for enhanced oil recovery. Major components of the project would include the pipeline, a booster station (Sand Wash Alternative only), a communication system, and Supervisory Control and Data Acquisition terminals.

The draft EIS analyzes the site-specific and cumulative effects of constructing, operating, and maintaining the

CO₂ pipeline and ancillary facilities of the Proposed Action and Sand Wash Alternative. This EIS also addresses the No-Action Alternative, including possible impacts from delays in CO₂ delivery, and references probable impacts of another source of CO₂ at Cortez, Colorado.

Based on the issues and concerns identified during the scoping process, the EIS focuses on potential impacts to socioeconomics, wildlife, water resources, soils, and vegetation. Direct and indirect impacts from the project as well as cumulative impacts are analyzed. Cumulative impacts are those that would occur from the Proposed Action or alternative plus other interrelated projects, existing or planned for development in the study area during the analysis period. In addition, this EIS analyzes impacts to five key issue areas—Red Creek Basin Escarpment, Jesse Ewing Canyon, Rye Grass Draw, McCort Canyon-Gap Creek, and Vermillion Bluffs.

EIS Contact

Comments on this EIS should be directed to:

Janis L. VanWyhe, Project Leader
Bureau of Land Management
Division of EIS Services
555 Zang Street, First Floor East
Denver, Colorado 80228

(303) 234-6737

Date EIS Made Available to EPA and the Public

August 31, 1984

Date by Which Comments Must be Received

October 30, 1984

PREFACE

The purpose of this environmental impact statement (EIS) is to analyze the potential environmental consequences resulting from construction, operation, and abandonment of the proposed Rangely Carbon Dioxide Pipeline Project and alternatives to this proposal. This EIS is intended to provide enough details to enable the public to understand the project and the decision makers to make a knowledgeable decision. Words and phrases in the text that are accompanied by asterisks are defined in the Glossary.

The EIS contains three chapters and eight appendices. Chapter 1 of this EIS contains a description of the Proposed Action, Sand Wash Alternative, and No-Action Alternative. Chapter 2 contains analyses of the affected environment and potential impacts from the

project to a variety of resource categories. This chapter also identifies benefits, trade-offs, and long-term commitments of resources. Chapter 3 contains energy efficiency and comparative analyses. The appendices provide additional resource material that supplement the information contained in this EIS.

The following federal action requests initiated the preparation of this EIS: applications for right-of-way grants across public land for a CO₂ pipeline, transmission lines, booster stations, microwave stations, and power substations. The results of this analysis, as documented in this EIS, will be used in making decisions on whether to approve, modify, or disapprove the above requested actions.

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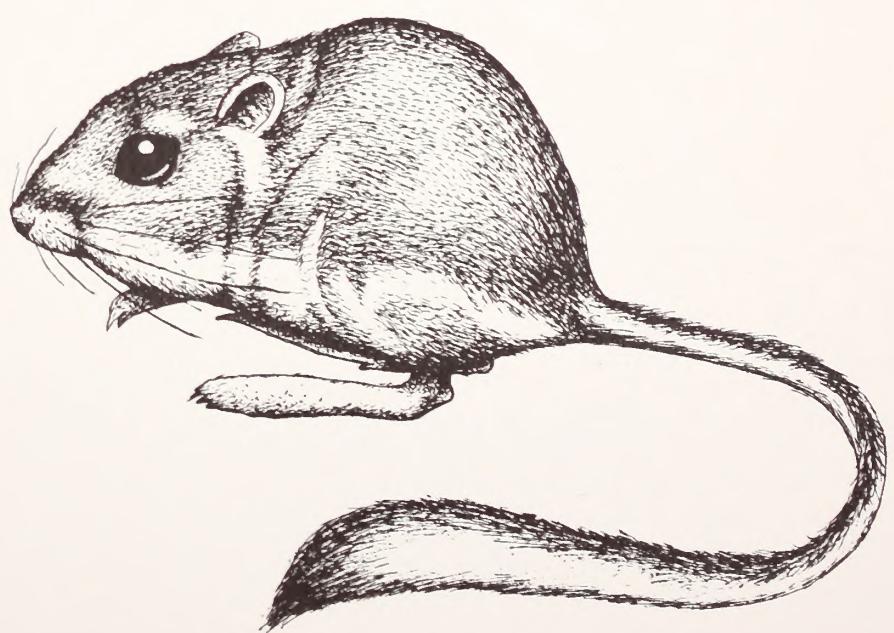
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Summary



YELLOW SWEETCLOVER



ORD KANGAROO RAT

SUMMARY

Chevron USA, Inc. has applied to the Bureau of Land Management (BLM) Wyoming, Utah, and Colorado State Offices, for a right-of-way permit to build and operate a 176-mile-long, 16-inch diameter pipeline to carry carbon dioxide (CO₂) from Exxon Corporation's proposed La Barge gas plant at the Shute Creek site northeast at Opal, Wyoming to the Rangely Weber Sand Unit oil field (Colorado) where the CO₂ would be used for *enhanced oil recovery.* Ancillary facilities include a microwave communication system, a Supervisory Control and Data Acquisition (SCADA) system to detect leaks, and a booster compressor station (Sand Wash Alternative only).

CO₂ would be produced at the La Barge gas plant and carried at a rate of 200 million standard cubic feet per day under compression of 2,200 to 2,700 pounds per square inch. Eventually the CO₂ would be injected into oil-bearing strata at the Rangely Weber Sand Unit oil field on an alternating cycle: 1 month of CO₂ injection followed by 2 weeks of water injection. This cycle would force marketable oil and gas from surrounding wells.

The Proposed Action route would parallel existing roads and pipelines for 92 percent of its length. From MP 80 to MP 120, the pipeline would be built simultaneously with Chevron Chemical Company's proposed phosphate slurry pipeline.

Pipeline construction is scheduled to begin in the second quarter of 1985 and be completed during the fourth quarter of 1985. Operation is scheduled to begin on January 1, 1986 and continue for the life of the well field injection project, 12 to 16 years, or as long as economically feasible. After well field injection ends, the pipeline could be extended and used to carry CO₂ to other destinations. The pipeline would have a 30- to 35-year life.

In addition to the Proposed Action, the Sand Wash and No-Action alternatives are considered in this analysis. Refer to Appendix 1 for maps detailing the locations and milepost (MP) numbers for the Proposed Action, Sand Wash Alternative, and related project facilities. (The maps are located in the inside back pocket of this environmental impact statement.)

MAJOR ISSUES

During the scoping process, several general concerns were raised relating to socioeconomics, wildlife, soils

and vegetation, and water resources. Appendix 2, Consultation and Coordination, lists the resource concerns; complete details on the scoping process are included in the *Rangely Carbon Dioxide Pipeline Public Scoping Results* document (BLM 1984a).

In addition to scoping concerns, the BLM believes the following key issue areas could most strongly be affected by the construction and operation of a CO₂ pipeline:

Red Creek Basin Escarpment

This area is located between MP 83.8 and 85.7 of the Proposed Action route near the northern edge of the Red Creek Watershed *Area of Critical Environmental Concern (ACEC)* and the Red Creek Badlands *Wilderness Study Area (WSA).* The *Red Creek Basin Escarpment* contains (a) a resistant sandstone ledge about 8 to 12 feet thick; (b) steep, sparsely vegetated sideslopes and badlands; and (c) strongly sloping to steep sideslopes (15 to 30 percent), vegetated with pinyon-juniper and a low-density *understory* of grasses and forbs.

Jesse Ewing Canyon

This narrow canyon, MP 99.8 and 102 of the Proposed Action route, contains springs, an intermittent stream, and slopes ranging from 9 to 28 percent. The canyon is bordered by steep mountain sideslopes (30 to 65 percent).

Rye Grass Draw

This area, MP 109.9 and 111.4 of the Proposed Action route, consists of a concave, mountain drainageway with slopes ranging from 9 to 28 percent. Portions of the draw with steeper (15 to 28 percent) slopes are usually narrow and bordered by steep mountain sideslopes (30 to 60 percent).

McCort Canyon-Gap Creek

This area, MP 82 and 85.3 of the Sand Wash Alternative route, consists of a perennial stream with a narrow drainageway bordered by strongly sloping and

SUMMARY

steep sideslopes (15 to 30 percent). Springs occur throughout the area; Iron Springs would be within the right-of-way.

Vermillion Bluffs

This area is located between MP 127.5 and 131.1 of the Sand Wash Alternative route and within the Lookout Mountain potential ACEC. *Vermillion Bluffs* has several sensitive plant species, rare plant communities, and high scenic values.

MAJOR IMPACT CONCLUSIONS

The analysis of the Rangely CO₂ Pipeline Project focuses on impacts caused by (1) displacing resources (such as removing of vegetation during construction), (2) using resources (such as workers and equipment to create needs for increased housing and expanded infrastructures), and (3) creating other changed conditions (such as increased visual disturbances). The analysis reveals that the impacts from this project could be managed without undue degradation to other natural resources. This project would cause some short-term, construction-related impacts, which are assessed in this EIS.

(No significant impacts would occur to federally listed threatened and endangered plant species, geological resources, sole sources of drinking water, prime and unique farmlands, or health and safety from implementation of either the Proposed Action or Sand Wash Alternative.)

Socioeconomics

Construction of the Proposed Action would not cause any significant, direct impacts because all impacts would be less than identified in the significance criteria. However, operation of the Proposed Action would cause significant, direct, beneficial impacts to economies affected by the Rangely Weber Sand Unit oil field for the following reasons:

The Proposed Action would allow oil production increases of 28 percent in Rio Blanco County and 14 percent in Colorado.

Oil-related tax revenues would be increased by 18 percent in Rio Blanco County, 26 percent in Rio Blanco County School District 4, and 10 percent in Rangely.

By extending the unit's life, the Proposed Action would postpone a 15 percent population loss in Rangely and equivalent losses in employment, income, business activity, and tax revenues.

Combined with the interrelated projects, the Proposed Action would contribute to the following significant, short-term (8 months), cumulative impacts:

Population growth of 10 percent in Rock Springs;

Employment growth of 8 percent and personal income growth of 9 percent in Sweetwater County; and

Tax revenue growth of 12 percent in Lincoln County.

Cumulative impacts to housing, *infrastructure,* and the quality of life would not be significant because Rock Springs and Sweetwater County have sufficient housing and infrastructure and previous experience in handling growth problems.

Impacts from the Sand Wash Alternative would be similar to those identified for the Proposed Action except that cumulative population growth in Rock Springs would be 10 percent, cumulative growth in Sweetwater County would be 9 percent, and cumulative personal income growth in Sweetwater County would be 10 percent.

Wildlife

The Proposed Action would cause no significant, long-term impacts to wildlife. Wildlife forage losses would be short term. A pipeline break or leak would not significantly affect fish. The automatic block valves with electric SCADA detection systems placed at Green River crossings would limit the amount of CO₂ released into the river in the event of a pipeline leak to less than 15 parts per million (ppm). The buffering capacity of the Green River would further limit the amount of CO₂, which would go into solution. Both the SCADA systems and the natural buffering would limit the level of CO₂ to a point where it would not be lethal to fish. The endangered Colorado squawfish would not be affected.

Impacts from the Sand Wash Alternative would be similar to those from the Proposed Action except for the amount of acreages of habitat affected. Cumulative impacts to wildlife would not occur from either the Proposed Action or the Sand Wash Alternative when added to the interrelated projects.

SUMMARY

Soils and Vegetation

Soil loss and reduction of soil productivity capacity from the Proposed Action and the Sand Wash Alternative would be insignificant because the effective use of the erosion control, reclamation, and revegetation program outlined in Appendix 3 would restore the soil to pre-construction productivity capacity. Accelerated wind and water erosion would cause some unquantifiable soil loss until erosion control measures were implemented.

Impacts to vegetation would generally be insignificant. Understory vegetation is expected to return to near preconstruction densities within 5 years after construction under the erosion control, reclamation, and revegetation program outlined in Appendix 3. Significant impacts could occur in low precipitation zones (less than 9 inches annually) if more than 5 years was required to establish adequate understory vegetation or if halogeton and other invader plants exceeded 10 percent of the plant cover. Grasses, however, could still be reestablished within 5 years using intensive erosion control and revegetation measures. The Proposed Action and the Sand Wash Alternative would not adversely affect any threatened, endangered, or sensitive plants.

Water Resources

The Proposed Action would not directly or cumulatively affect the flow or salinity of the Green River. The pipeline would affect two areas critical to watershed management that would require special construction and rehabilitation techniques: Richards Gap and *Red Creek Basin Escarpment*. Other components of the Proposed Action would cause no significant impacts. Construction and operation of a pipeline along the Proposed Action route would not affect floodplains.

Construction and operation of the Sand Wash Alternative would not significantly affect water resources, nor would it when combined with interrelated projects.

Agriculture

Construction and operation of the Proposed Action and Sand Wash Alternative routes would not significantly affect agriculture nor cause any significant long-term conversion of grazing land or cropland. However, some short-term impacts to livestock could occur from pipeline construction during the grazing season:

- livestock access to watering facilities could be disrupted for longer than 1 day;
- Grazing patterns could be disrupted from the trench being left open for longer than 14 days; and
- livestock grazing control problems could occur from gates or temporary gap fences being left unsecured.

Visual Resources

Vegetative clearings needed for the Proposed Action pipeline would create visual contrasts that would conflict with Visual Resource Management (VRM) objectives for the following classes and acreages: VRM Class II—120 acres and VRM Class III—40 acres. Additional impacts would be caused from construction of facilities, such as the power distribution lines and the antennas that would be added to existing microwave stations. The Sand Wash Alternative would create visual contrasts that would conflict with VRM objectives for the following classes and acreages: VRM Class II—94 acres, VRM Class III—33 acres, and VRM Class IV—40 acres.

Cultural Resources

Because the exact locations of the pipeline and ancillary facilities are unknown for either the Proposed Action or the Sand Wash Alternative routes, specific impacts cannot be predicted. Effective use of the cultural survey and compliance procedures described in Appendix 3 should prevent significant, adverse cultural resource impacts.

Recreation Resources

Impacts to dispersed recreation opportunities and demand upon developed recreation sites would be insignificant from both the Proposed Action and the Sand Wash Alternative. The road and pipeline crossing at MP 160.5 of the Sand Wash Alternative route could become a take out or put in point for kayakers, fishermen, or hunters recreating along the Yampa River.

Wilderness

Pipeline construction and operation would not significantly affect the wilderness resource base along the Proposed Action route. Sights, sounds, and dust from simultaneous pipeline construction along the northwest boundary of Red Creek Badlands WSA could diminish

SUMMARY

the quality of primitive and unconfined recreation within a small portion of the WSA from 4 to 6 weeks.

Similiar impacts (1 to 2 weeks) could occur from construction of the Sand Wash Alternative route along the boundaries of the Cross Mountain, Skull Creek, and Willow Creek WSAs. In addition, power distribution lines to the SCADA terminal at the Yampa River crossing, MP 160, could be seen from the Cross Mountain WSA.

Transportation Networks

Pipeline construction would significantly but temporarily increase traffic volume and impede traffic flow on roads that would serve as access to the Proposed Action and Sand Wash Alternative routes. Existing pipelines that would be paralleled by the Proposed Action could be disrupted by construction if accidental damage occurred. Increases in vehicle miles on specific roadways could increase traffic accidents, thereby increasing the risk to traveler health and safety. The use of the dirt roadways during wet weather could damage roadbeds.

Air Quality

Pipeline construction along the Proposed Action and Sand Wash Alternative routes would temporarily and insignificantly increase dust and gaseous ambient air concentrations. These impacts would be localized, would not affect regional air quality, and would be dispersed over a large area.

Paleontological Resources

During construction of the Mid-America Pipeline

Company (MAPCO) pipeline below the *Red Creek Escarpment*, an important fossilized crocodile skull was discovered.

The potential exists for future discoveries during construction of the Proposed Action.

Land Use Conflicts and Constraints

The Proposed Action and Sand Wash Alternative would cross several areas currently leased for oil and gas, and trona. Care would be needed during construction to avoid inadvertent damage to the existing small pipelines on the oil and gas fields. A slight potential also exists for subsidence in the trona leases triggered by pipeline construction activities, and future subsidence could occur from trona mining which could damage the CO₂ pipeline. The Sand Wash Alternative would cross the Bean Springs Coal Preference Right Lease Area (PRLA) which is currently under consideration for leasing. The pipeline could cause potential interference with future mining operations. However, these could be worked out with the companies involved.

The Proposed Action and Sand Wash Alternative routes would not conflict with any other land use plans.

AGENCY PREFERRED ALTERNATIVE

The BLM Agency Preferred Alternative is the Proposed Action as proposed by Chevron USA, Inc. The CO₂ pipeline would have to be built during the same year as Chevron Phosphate Project. The Proposed Action would also have to be built simultaneously with the phosphate pipeline from the top of the *Red Creek Escarpment* to the head of *Rye Grass Draw*.

Chapter 1

Description of the

Proposed Action and

Alternatives



DOUGLAS-FIR



PRONGHORN

CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

INTRODUCTION

This chapter of the Environmental Impact Statement (EIS) describes the Chevron USA, Inc. (Chevron) proposal to construct, operate and maintain a 176-mile-long, 16 inch diameter pipeline from the Exxon Company USA (Exxon) compressor station in Sweetwater County 7 miles south of Fontenelle (Painter's Store), Wyoming to Rangely, Colorado. The proposed pipeline would transport high pressure carbon dioxide (CO_2) from the compressor station, associated with the La Barge gas plant, to the Rangely Weber Sand Unit oil field where the CO_2 would be injected into oil-bearing strata for enhanced oil recovery. The La Barge natural gas treatment plant, currently being built by Exxon, was analyzed as part of the Shute Creek Alternative in the *Riley Ridge Natural Gas Project EIS* (BLM 1983a). As part of that alternative, the plant was analyzed as having 1.2 billion cubic feet per day (cfd) capacity to process natural gas. As currently being built, the La Barge gas plant will have a processing capacity of 600 million cfd, to be built in two phases: phase 1, two modules of 200 million cfd each for a total of 400 million cfd, and phase 2, another 200 million cfd. Construction of Phase 2 is planned for the future.

The first 26.5 miles of the proposed pipeline could potentially become a common carrier pipeline and be enlarged to over 24 inches in diameter. If this occurred, environmental impacts would be the same as those from a 16 inch diameter pipeline. Nonetheless, the final EIS will address any changes stemming from this type of modification.

The gas plant description also differs from the *Riley Ridge Natural Gas Project EIS* in that the location for the initial compressor station has been moved slightly east into Sweetwater County where electricity can be purchased from Pacific Power and Light Company at a significantly lower rate than from Utah Power and Light.

The compressor station; a microwave terminal station; a 1.5-mile-long, 230 kilovolt (kV) power transmission line; a 36 inch diameter CO_2 pipeline; a methane pipeline;

and an access road from the treatment plant to the compressor station have been analyzed in the *Wyoming CO_2 Compressor Station Environmental Assessment* (EA) (BLM 1984c). Although the compressor station, microwave station, power transmission line, CO_2 pipeline, and road are associated with the CO_2 pipeline analyzed in this EIS, they are not part of this project and, therefore, not included in this analysis.

The Rangely oil field booster station, a microwave terminal station, and other facilities and activities associated with the distribution, injection, and recovery of CO_2 in the Rangely Weber Sand Unit oil field are also associated with the CO_2 pipeline but have been analyzed separately in an EA scheduled for publication in September 1984 by the BLM, Craig District Office.

This EIS analyzes only the impacts from the following components of the pipeline project:

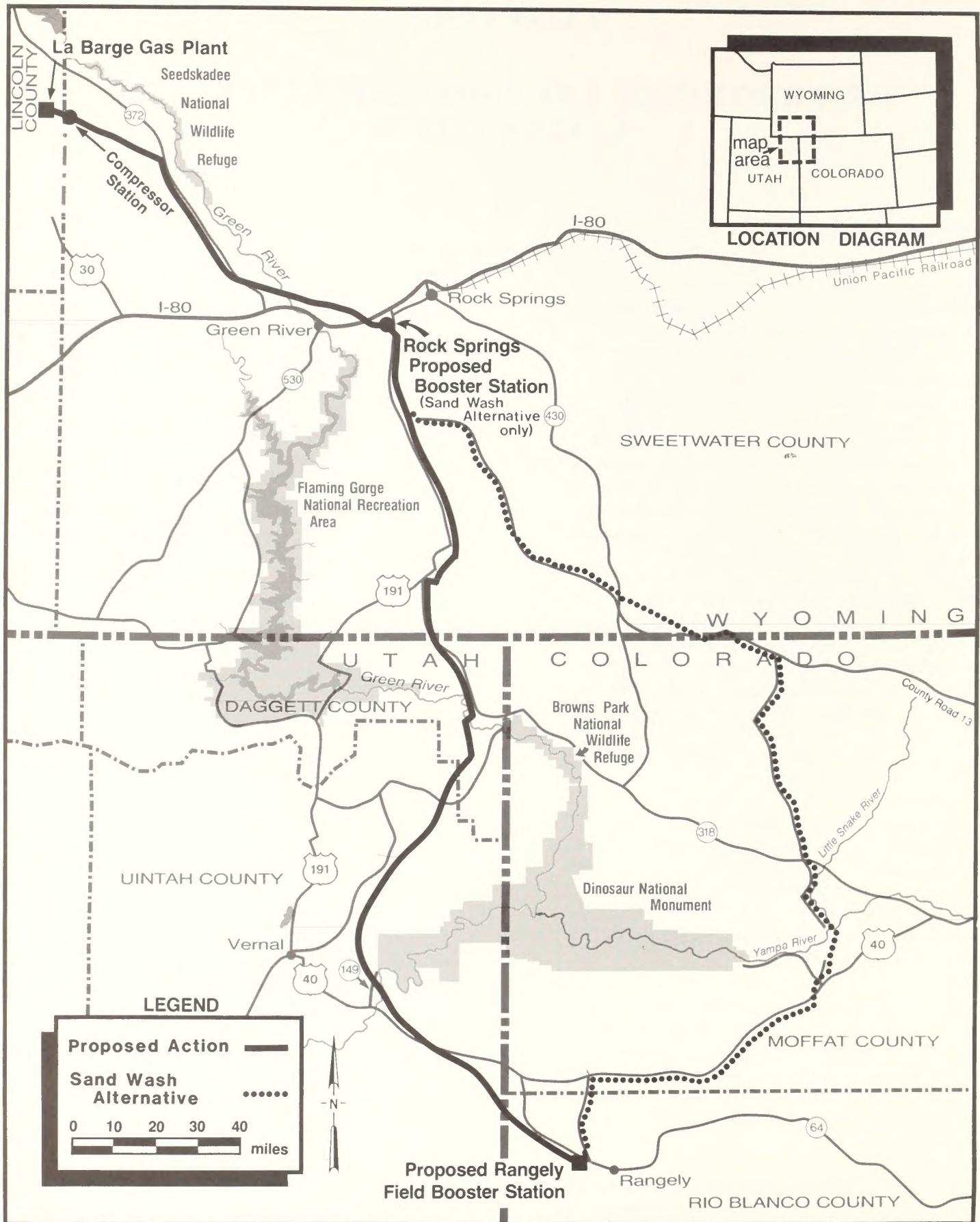
- CO_2 pipeline
- CO_2 scraper traps
- Communication system
- Block valves and leak detection (SCADA) system, including power distribution lines

These components are described in detail in the Proposed Action section of this chapter.

The EIS also analyzes the Sand Wash Alternative which would transport the CO_2 to the Rangely Weber Sand Unit along a route extending from Wyoming to Colorado east of Browns Park National Wildlife Refuge and Dinosaur National Monument. The Sand Wash Alternative would require a booster compressor station at MP 52. The Proposed Action and Sand Wash Alternative routes are shown on Map 1-1.

The No-Action Alternative is also analyzed in this EIS. The probable result of implementing the No-Action Alternative would be that CO_2 from Cortez, Colorado would be used, and a pipeline from Cortez to Rangely, Colorado would be built.

Editor's Note: Words or phrases enclosed by asterisks are defined in the Glossary.



AUTHORIZING ACTIONS

Purpose and Need of Proposed Action

The purpose of the Proposed Action is to transport approximately 200 million standard cubic feet per day (scfd) of CO₂ from Exxon's La Barge gas plant in Wyoming to the Rangely Weber Sand Unit oil field (operated by Chevron) in Colorado for *enhanced oil recovery.* Chevron models predict that 7.5 percent of the original oil in place or 106 million stock tank barrels could be recovered. The Proposed Action is needed to recover the additional volumes of oil and prolong the productivity of the oil field. Carbon dioxide has proven effective for enhanced oil recovery and is now being considered because of economic reasons and the availability of CO₂ from the La Barge gas plant.

Location of the Proposed Action

The Proposed Action pipeline would begin at the CO₂ compressor station being built in Sweetwater County, Wyoming, 1.5 miles from the La Barge gas plant being built in Lincoln County, Wyoming. The compressor station is part of the La Barge gas plant project. The pipeline would continue south through Sweetwater County, cross the Utah border into Daggett and Uintah counties where it would turn southeast and extend into Rio Blanco County, Colorado, and end at the Rangely Weber Sand Unit oil field near Rangely, Colorado. Refer to Map 1-1 for the general location of the proposed CO₂ pipeline. This map also shows the locations of the Sand Wash Alternative and Exxon's La Barge gas plant.

Authorizing Actions

The proposal would require federal authorization for rights-of-way for a CO₂ pipeline, communication facilities, and power distribution lines. The proposal would also require various state authorizations.

Table 1-1 shows the types of major permits, approvals, and other authorizing actions that would be required for construction and operation of the project. Appendix 3 identifies the general resource measures that will be attached to any of the federal right-of-way grants.

One measure is the preparation of a Construction/Operation (CO) plan or similar document, covering the construction of all project facilities on federal land. This plan (which is also sometimes referred to as a Construction and Use plan) will be submitted to the authorizing agencies for approval before any work on the ground begins. The CO plan will contain site-specific procedures for the following sections. (Because the various rights-of-way will involve many types of terrain,

soils, vegetation, land uses, and climatic conditions, the sections within the CO plan will include sets of techniques and measures tailored to each condition encountered.)

- Engineering and Drawings
- Fire Protection
- Clearing—Visual Resources
- Erosion Control, Revegetation, and Restoration
- Water Resources
- Transportation
- Communications
- Cultural Resources
- Threatened and Endangered Plant and Animal Species Studies and Mitigation
- Wildlife Mitigation
- Blasting
- Pesticide and Herbicide Use
- Health and Safety
 - Solid Waste
 - Emergency Response
 - Air Quality
- Construction Schedule
- Housing and Construction Facilities
- Testing (Pipeline)
- Monitoring of Construction
- Operations and Maintenance
- Abandonment

Technical assistance and approval of written CO plans for federally managed lands will be obtained from the BLM before any construction.

Interrelationships

OTHER PROJECTS

Four proposed developments are expected to coincide with construction of this project: (1) the La Barge gas plant, (2) the Chevron Phosphate Project, (3) the Jim Bridger power plant modification, and (4) the Western Wyoming Community College expansion. These projects are described in Table 1-2. The collective total employment would be 1,540 personnel. The mitigation required for the Chevron Phosphate Project would reduce the cumulative impacts between it and the CO₂ pipeline. Appendix 3 identifies the required mitigation needed for the BLM right-of-way grant for the CO₂ pipeline. It also identifies the State of Wyoming, Industrial Siting Administration permit stipulations for the Chevron Phosphate Project. These stipulations will reduce the impacts from the phosphate project, thereby greatly reducing cumulative impacts between it and the proposed CO₂ pipeline.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

TABLE I-1
MAJOR FEDERAL, STATE, COUNTY, AND LOCAL AUTHORIZING ACTIONS

Agency	Nature of Action	Authority	Project Feature (Applicable Project)
MAJOR FEDERAL AUTHORIZING ACTIONS			
DEPARTMENT OF THE INTERIOR			
Bureau of Land Management	Grant rights-of-way and issue temporary use permits	Section 28 of the Mineral Leasing Act of 1920.	All facilities
	Grant rights-of-way and issue temporary use permits	Title V, Section 501 of the Federal Land Policy and Management Act	Power distribution Lines
	Issue materials sales contract	Materials Act of July 31, 1947, as amended; 30 U.S.C. 601, 602, 43 CFR 3600	All facilities
National Park Service ¹	Issue antiquities or archaeological resource permit to excavate or remove archaeological resources on Lands	Antiquities Act of 1906, 16 U.S.C. Sections 431–433; Archaeological Resources Public Protection Act of 1979, 16 U.S.C. Sections 470aa–470ll; 43 CFR Part 3	All facilities
Fish and Wildlife Service	Grant rights-of-way crossing national wildlife refuge	Section 28 of the Mineral Leasing Act of 1920, 30 U.S.C. Section 185; 50 CFR Section 29.21	Pipeline
DEPARTMENT OF TRANSPORTATION			
Federal Highway Administration	Issue permit(s) to cross Federal-aid highways	23 U.S.C. Sections 116, 123, 315; 23 CFR Part 645 Subpart B	Pipeline
DEPARTMENT OF AGRICULTURE			
Forest Service	Issue temporary special use permit for constructing rights-of-way and facilities	Title V, of the Federal Land Policy and Management Act; Section 28 of the Mineral Leasing Act, 1920	Microwave site
U.S. DEPARTMENT OF THE ARMY			
Corps of Engineers	Issue (Section 404) permit for placement of dredged or fill material in waters of the United States or their adjacent wetlands	Section 404 of the Clean Water Act of 1972 (40 CFR 122–123), 33 U.S.C. Section 1344; 33 CFR Parts 323, 325	Pipeline
	Issue Section 10 permit for crossing navigable waters in the U.S.	Section 10 of the River and Harbor Act of 1899, 33 U.S.C. 401–413	Pipeline
DEPARTMENT OF THE TREASURY			
Bureau of Alcohol, Tobacco, and Firearms	Issue permit(s) to purchase store, and use explosives	Section 1102(a) of Organized Crime Control Act of 1970, 18 U.S.C. Sections 841–848; 27 CFR Part 181	Pipeline
FEDERAL COMMUNICATIONS COMMISSION			
	License to operate industrial radio service	Section 303 of Communications Act of 1934, 47 U.S.C. Section 303; 47 CFR Parts 90, 94	Microwave equipment

AUTHORIZING ACTIONS

TABLE I-1 (Continued)
MAJOR FEDERAL, STATE, COUNTY, AND LOCAL AUTHORIZING ACTIONS

Agency	Nature of Action	Authority	Project Feature (Applicable Project)
MAJOR STATE AUTHORIZING ACTIONS			
COLORADO			
STATE LAND BOARD	Issue easements to cross state lands		Pipeline
DEPARTMENT OF HEALTH, Air Pollution Control Division	Issue air pollution emissions permit	Colorado Air Quality Control Act, amended, 25-7-101 et. seq.	Pipeline
OFFICE OF STATE ARCHAEOLOGIST	Issue permit to survey or disturb archaeological or paleontological sites on state land	Colorado Revised Statute 1973, Title 24, Chapter 80, paragraphs 401-410	Pipeline
UTAH			
DEPARTMENT OF NATURAL RESOURCES AND ENERGY			
Division of Forestry and Fire Control	Issue burning permit during closed fire season	Utah Code Annotated Section 4-2-12 (1976)	Pipeline
Division of Wildlife Resources	Issue easements to cross division lands	Utah Code Annotated Section 23-4-8	Pipeline
DEPARTMENT OF DEVELOPMENT SERVICES	Issue permit to survey or disturb archaeological or paleontological site on state land	Utah Code Annotated Section 63-18-25 (1978)	Pipeline
DEPARTMENT OF TRANSPORTATION			
Highway Patrol	Issue encroachment permits	Utah Code Annotated Section 27-12-11 (1976)	Pipeline
	Issue overweight truck permits for delivery of materials to plant site	Utah Code Annotated Section 27-12-155 (1976)	Pipeline
DEPARTMENT OF HEALTH, DIVISION OF ENVIRONMENTAL HEALTH			
Bureau of Air Quality	Issue open burning permit	Utah Code Annotated Section 26-13-6(1) (Supp. 1981)	Pipeline
INDUSTRIAL COMMISSION			
Division of Occupational Safety and Health	Inspect surface construction for worker safety	Utah Code Annotated Sections 35-91 et seq. (1974)	Pipeline
STATE LAND BOARD	Issues easements to cross state land		Pipeline
WYOMING			
DEPARTMENT OF ENVIRONMENTAL QUALITY			
Air Quality Division	Issue air quality construction permit	Wyoming Environmental Quality Act, W.S. 35-502-101 through 35-502-1207	Pipeline

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

TABLE 1-1 (Concluded)
MAJOR FEDERAL, STATE, COUNTY, AND LOCAL AUTHORIZING ACTIONS

Agency	Nature of Action	Authority	Project Feature (Applicable Project)
Water Quality Division	Issue National Pollution Discharge Elimination System Permit for discharge of hydrostatic test water	Wyoming Environmental Quality Act, W.S. 35-11-301	Pipeline
STATE HIGHWAY DEPARTMENT	Issue permits for oversize and overweight loads	Chapters 17 and 20 of the Wyoming Department of Highways Rules and Regulations	Pipeline
	Issue Encroachment permits	Chapter 12 of the Wyoming Department of Highways Rules and Regulations	Pipeline
STATE LAND BOARD	Issue easements to cross state lands	Pipeline	

MAJOR COUNTY AND LOCAL AUTHORIZING ACTIONS

COLORADO			
Moffat County	Conditional use permit	Moffat County Zoning Resolution Section 410.3 (item 11)	Pipeline, microwave tower, and 2 SCADA terminals.
Rio Blanco County	Conditional use permit	Rio Blanco County Zoning Ordinance Land use development department regulations	Pipeline, microwave tower
UTAH			
Daggett County	Issue building permit	Daggett County Zoning Ordinance	Pipeline
Uintah Basin District Health Department	Issue inspection and letter of approval for public Health-related facilities on plant sites and at construction camps	Utah Code Annotated, 1981, Supplement; Title 26, Chapter 24, Section 1-24	Pipeline
Uintah County	Issue building permits	Uintah County Zoning Ordinance	Pipeline
	Issue temporary use permits	Uintah County Zoning Ordinance	Pipeline
	Issue conditional use permit	Uintah County Zoning Ordinance	Pipeline
	Issue extraction of earth products permit	Uintah County Zoning Ordinance	Pipeline
WYOMING			
Lincoln County	Issue development permit	State Development and Permit Resolution, July 8, 1981; Fees October 7, 1981	Pipeline
	Issue agreement for county road use	State Development and Permit Resolution, July 8, 1981; Fees October 7, 1981	Pipeline
Sweetwater County	Issue zoning permits (Construction or alteration permit, and conditional use permit)	W.S. 18-5-201 through 18-5-207; Wyoming Statutes Annotated 1977, republished edition	All facilities

¹ In October 1984, this authority will be transferred to the BLM

INTERRELATIONSHIPS

TABLE 1-2
INTERRELATED PROJECTS

Project	Description	Location	Area Required
Exxon's La Barge gas plant at Shute Creek site	Construction of a 0.6 billion cubic feet per day gas treatment plant, including compressor station	20 miles northeast of Opal, Wyoming, in Lincoln County	7,500 acres for all facilities, of which 640 acres would be interrelated.
Chevron Phosphate Project	Construction of a fertilizer plant and 98-mile long slurry pipeline from a mine near Vernal, Utah to the plant	4 miles south of Rock Springs, Wyoming in Sweetwater County	1,500 acres for all facilities, of which 345 acres would be interrelated
Jim Bridger power plant	Retrofitting of pollution control equipment	26 miles northeast of Rock Springs, Wyoming	Existing facility plus 1,080 acres for new desulfurization ponds
Western Wyoming Community College	Expansion	Rock Springs, Wyoming	None, existing facility

SPECIAL MANAGEMENT AREAS

Seven special management areas (Maps A1-1 and A1-2, Appendix 1) would be crossed or be within 1 mile of the Proposed Action: (1) the Seedskadee National Wildlife Refuge, (2) the Mormon Pioneer National Historic Trail, (3) the Oregon National Historic Trail, (4) the Red Creek Badlands *Wilderness Study Area (WSA),* (5) the Red Creek Watershed *Area of Critical Environmental Concern (ACEC),* (6) the Green River Scenic Corridor ACEC, and (7) the Raven Ridge potential ACEC.

The Proposed Action would cross 0.5 mile of the Seedskadee National Wildlife Refuge at two locations. The Proposed Action would also cross both the Mormon Pioneer and Oregon National Historic Trails (NPS 1981a; 1981b). Approximately 3 miles of the proposed pipeline would parallel the northwest boundary of the Red Creek Badlands WSA. The Bureau of Land Management (BLM), Wyoming State Director has recommended that the entire 8,020-acre WSA be considered unsuitable for wilderness preservation. The *Rock Springs District Wilderness Preliminary Final Environmental Impact Statement and Wilderness Study Report* (BLM 1984b) provides the rationale for this recommendation.

The Proposed Action would cross the Red Creek Watershed ACEC, which overlaps the Wyoming-Utah border

and is a critical watershed area. The pipeline would also cross the Green River Scenic Corridor ACEC in the Browns Park area of Utah. The National Park Service (NPS) determined in its *Green and Yampa Rivers Wild and Scenic River Study draft EIS* (1983) that 91 miles of the Green River, from the Flaming Gorge Dam downstream to the southern boundary of Dinosaur National Monument, is eligible for designation as a Wild and Scenic River pending resolution of a number of interrelated activities (*Federal Register* 1983). The proposed pipeline would parallel a portion of and cross the Green River in the Browns Park area along a segment of the Green River now proposed as "scenic" rather than "recreational" (*Federal Register* 1983).

The proposed pipeline would cross the Green River at another point north of Jensen, Utah within a segment of the Green River inventoried by the NPS under the Nationwide Rivers Inventory program. A total of 193 miles of the Green River, from Range Creek upstream to the Yampa River, has been identified as having national significance and is a potential candidate for Wild and Scenic River status (NPS 1982).

The proposed pipeline would also cross approximately 0.2 mile of the Raven Ridge potential ACEC west of the Rangely Weber Sand Unit oil field in Colorado (BLM 1981a). This 7,840-acre potential ACEC is being managed under the BLM *Areas of Critical Environmental Concern, Policy and Procedures Guidelines, Temporary Management Policy* (BLM 1980a).

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The Sand Wash Alternative would cross or be within 1 mile of the boundary of nine special management areas (Maps A1-1 and A1-2, Appendix 1): (1) the Seedskadee National Wildlife Refuge, (2) the Mormon Pioneer National Historic Trail, (3) the Oregon National Historic Trail, (4) the Hells Canyon potential ACEC, (5) the Lookout Mountain potential ACEC, (6) the Cross Mountain potential ACEC, (7) the Cross Mountain WSA, (8) the Skull Creek WSA, and (9) the Willow Creek WSA. The alternative pipeline route would cross approximately 0.5 mile of the Seedskadee National Wildlife Refuge in the same two locations as the Proposed Action. It would also cross both the Mormon Pioneer and Oregon National Historic Trails (NPS 1981a; 1981b). The alternative would come within 0.25 mile of the boundary of the Hells Canyon potential ACEC located in Colorado along the Wyoming-Colorado border. The alternative would cross approximately 9.5 miles of the Lookout Mountain potential ACEC along the eastern slope of Vermillion Bluffs in Colorado.

The alternative pipeline route would be approximately 1 mile from the Cross Mountain potential ACEC. The Hells Canyon, Lookout Mountain, and Cross Mountain potential ACECs are managed under the BLM *Areas of Critical Environmental Concern, Policy and Procedures Guidelines*, Temporary Management Policy (BLM 1980a). The alternative pipeline route would be from 0.25 to 1 mile away from the Cross Mountain WSA. A recommendation concerning wilderness suitability will be forthcoming in the BLM *Little Snake Resource Management Plan Draft EIS*, scheduled to be published in April 1985.

The Sand Wash Alternative would parallel US Highway 40 west of Skull Creek, Colorado and be within 0.5 mile of the southern boundary of the Skull Creek WSA. The alternative would parallel Willow Creek WSA for 1 mile from Blue Mountain east along US Highway 40. The *White River Resource Area Wilderness Planning Amendment draft EIS* (BLM 1983b) recommended that both the Skull Creek and Willow Creek WSAs be considered unsuitable for wilderness preservation.

HISTORY AND BACKGROUND

The Rangely Weber Sand Formation, discovered in 1933, has been producing oil and gas in commercial quantities since 1944. The Rangely Weber Sand Unit was *unitized* in 1957; Chevron USA, Inc. is the operator. In order to increase productivity and recover more oil, injection of water *(waterflooding)* into the Rangely Weber Sand Formation began in 1958 and continues today.

On November 30, 1983, Exxon and Chevron applied for a right-of-way with BLM for the CO₂ pipeline. Since then, as Exxon and Chevron agreed, Chevron has assumed total responsibility for the application.

OVERVIEW OF PROPOSED ACTION AND ALTERNATIVES

Chevron, as operator of the Rangely Weber Sand Unit oil field, proposes to initiate a CO₂ enhanced oil recovery project within the unit. The CO₂ would be produced at the Exxon La Barge gas plant as a by-product of methane *cracking.* The CO₂ would contain:

- no less than 96 percent CO₂;
- no more than 2 percent nitrogen;
- no more than 1 grain hydrogen sulfide (H₂S) per 100 standard cubic feet;
- no more than 20 pounds of water per million standard cubic feet; and
- no more than 20 grains total sulfur per 100 standard cubic feet.

Chevron proposes to transport 200 million scfd of CO₂ to the Rangely Weber Sand Unit oil field through a 16-inch diameter, high-pressure pipeline. The CO₂ would be compressed to 2,200 to 2,700 pounds per square inch (psi) at an electric compressor station 1.5 miles east of the La Barge gas plant.

The CO₂ would reach the booster station at the Rangely Unit oil field, where it would be recompressed to 3,000 psi and then injected into the Rangely Weber Sand Formation using a one to one, water-alternating-gas process.

Project Components

The following project components are analyzed in this EIS:

- 176-mile-long, 16-inch diameter CO₂ pipeline;
- Supervisory Control and Data Acquisition (SCADA) terminal to control two block valves at milepost (MP) 38, crossing the Green River; and a 3-mile-long, 15 kV distribution line;
- Scraper trap, SCADA terminal, and block valve, plus a 0.5-mile-long, 15 kV distribution line and a 0.5-mile-long access road at MP 52 near Rock Springs;

PROPOSED ACTION PROJECT DESCRIPTION

- SCADA terminal, block valve, and 100-foot-long, 220 volt power distribution line at MP 90, adjacent to the Chevron phosphate pipeline booster station;
- SCADA terminal, block valve, and a 200-foot-long, 220 volt power distribution line at MP 123.5 where the Proposed Action route leaves the Chevron phosphate pipeline route;
- SCADA terminal at MP 142.3 to control two block valves which would be located at MP 142.3 and 145.2 on either side of the Green River, and a 0.5-mile-long, 15 kV distribution line;
- five microwave repeater stations (all at existing facilities);
- block valves approximately 20 miles apart in addition to those mentioned.

Pipeline construction would begin in the second quarter of 1985 and be completed during the fourth quarter of 1985. The CO₂ injection is scheduled to begin January 1, 1986. The CO₂ pipeline could be operated for 30 to 35 years before it would need to be replaced. The CO₂ injection program would be carried out for 12 to 16 years but could be extended, as long as the program was successful. This EIS analyzes a pipeline life of 30 to 35 years before abandonment.

Land Status and Ownership

The proposed project components would involve federal, state, and private lands. Appendix 4 lists the miles by land status, ownership, or management that would be disturbed by the Proposed Action and the Sand Wash Alternative. The Proposed Action would disturb land under the following ownership or management:

- 1,209.9 acres of land managed by BLM
- 619.5 acres of private land
- 81.0 acres of land owned by the Utah Division of Wildlife Resources
- 69.6 acres of land owned by the State of Utah
- 7.2 acres of land owned by the State of Wyoming
- 4.8 acres of land managed by the Fish and Wildlife Service (Seedskadee National Wildlife Refuge)

PROPOSED ACTION PROJECT DESCRIPTION

Pipeline

The Proposed Action would parallel existing roads or pipeline installations for approximately 163 miles or 92 percent of the total pipeline length. These existing facilities include Wyoming State Highway 372 from MP 13 to 38, the Trailblazer natural gas line between MP 38 and 52, the Mountain Fuel pipeline between MP 52 and 59, the Mid-America Pipeline Company (MAPCO) liquid hydrocarbon line between MP 59 and 168, and the Northwest pipeline from MP 168 to the Rangely Weber Sand Unit oil field. From the top of the Red Creek Escarpment, down to the Green River, and up to the head of Rye Grass Draw, the CO₂ pipeline would parallel MAPCO's existing line and be constructed simultaneously with Chevron Chemical Company's proposed phosphate slurry pipeline to conserve space in the pipeline corridor and lessen social and environmental impacts.

Block Valves and SCADA Terminals

Mainline block valves would be placed at 15- to 20-mile intervals along the pipeline. Block valve pairs would be installed at each crossing of the Green River, one on each side. Figure 1-1 shows a typical SCADA terminal with block valve. Block valves and SCADA terminals can be placed away from the view of the River and painted to blend into the environment.

In addition, five SCADA terminals would be installed, at MP 38 and 143, two of the Green River crossings, one at the Rock Springs scraper trap facility, MP 52, one at the Chevron phosphate booster station at Richards Gap, MP 90, and one at MP 123.5 where the Proposed Action route leaves the Chevron phosphate pipeline route. SCADA terminals would detect leaks more efficiently than automatic block valves. The facilities would include a 6-by 5- by 8-foot control building, a 20-to 50-foot-high microwave tower, and a 15 kV power distribution line. The terminals would cover an area about 40 feet square. Varying lengths of distribution lines would be needed for each SCADA terminal, depending upon location. See Maps A1-1 and A1-2 for locations of terminals. SCADA terminals could be placed as far as 0.25 mile from the block valve, which is attached to the terminal with a ground wire.

(NOT TO SCALE)
(ENCLOSURE IS FENCED)

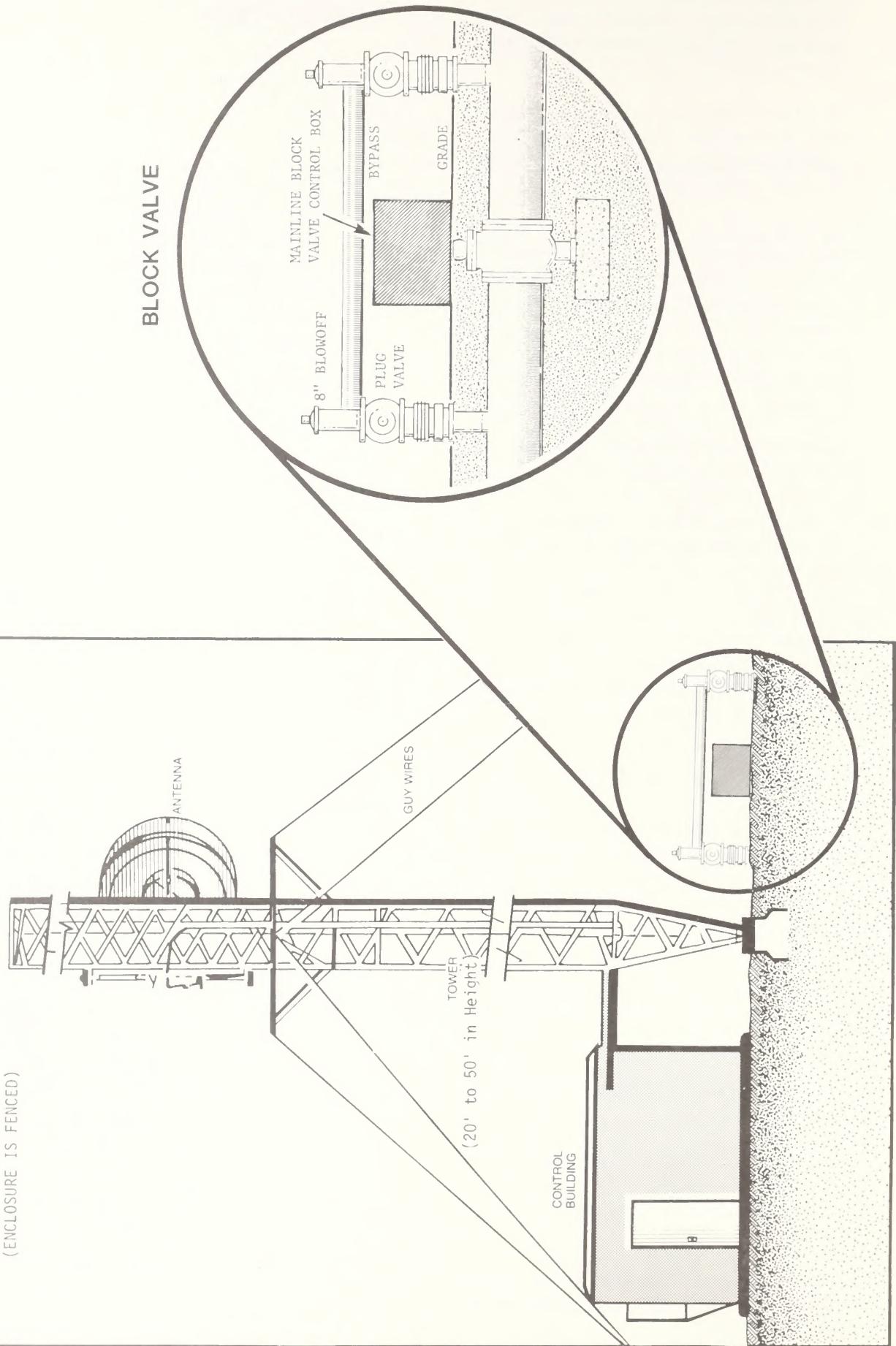


FIGURE 1-1 TYPICAL SCADA TERMINAL WITH BLOCK VALVE

PROPOSED ACTION PROJECT DESCRIPTION

SCADA terminal 1	MP 38	Green River	3-mile-long, 15 kV power distribution line
SCADA terminal 2	MP 52	Rock Springs	0.5 mile-long, 15 kV power distribution line
SCADA terminal 3	MP 90	Richards Gap	100-foot-long, 200 volt power distribution line
SCADA terminal 4	MP 123.5		200-foot-long, 200 volt power distribution line
SCADA terminal 5	MP 143	Green River	0.5 mile-long, 15 kV power distribution line

Pipeline route markers would be installed at road crossings, water crossings, property boundaries, and other pipeline crossings in locations where the markers would not interfere with existing land use. Aerial markers would be installed at intervals along the route and at all turning points, where possible, to facilitate aerial patrol of the pipeline.

Scraper Trap

The Rock Springs scraper trap and a SCADA terminal would be located in section 24, Township 18 North, Range 106 West, 0.5 mile from US Highway 191. Power for the scraper trap would be purchased from Pacific Power and Light. A 0.5-mile-long, 15 kV distribution line would follow the access road from an existing power line to the scraper trap.

The scraper trap would consist of one trap and one scraper launcher, a control building with SCADA monitoring equipment, and miscellaneous valves and piping. Figure I-2 shows a typical scraper trap.

All exposed structures would be designed to reduce visibility of forms and material types, textures, and colors.

Communication System

Communications would initially be by telephone. This would involve buried telephone lines between various facilities, such as the compressor station and Rangely Weber Sand Unit oil field, and existing telephone lines. The telephone lines would be buried in the road ditches with no visible disturbances.

The eventual communication system for the Proposed Action and the Sand Wash Alternative would consist of microwave radio equipment that would interconnect the pipeline system and the Rangely field production office. Consisting of a terminal station and five repeater stations, the system would provide the following services:

- Fixed-station, voice communication: Telephone service for operations personnel.
- Mobile communications: Radio communication for maintenance bases and associated field units.
- Data communication: Transmission of digital and analog data for the supervisory control system.

The terminal station would be located at the Rock Springs scraper trap. The communication system would tie into two other terminals, one of which would be located at the La Barge gas plant compressor station and the other at the Rangely field production office. Repeater stations would be located on or near mountain peaks, 25 to 45 miles apart, somewhat paralleling the pipeline route.

The five repeater stations would be located at the following existing microwave sites: Wilkins Peak, Tepee Mountain, Grizzley Ridge, Blue Mountain, and Raven Ridge (Maps A1-1 and A1-2.) Facilities at the first four sites would be developed for the Chevron Phosphate Project (BLM 1983c), and the Proposed Action Pipeline would need only the addition of two more dishes and a VHF antenna for each tower. New facilities, including an 8-foot-square shelter and a 30-foot-high tower with microwave dishes and VHF antenna, would be required at the Raven Ridge site. A typical terminal or repeater station would include the equipment shown in Figure I-3.

The proposed communication system would use radio frequencies in the portion of the spectrum designated as "Private Operation, Fixed Microwave Services." Fixed-station voice communication would be carried using voice channels and conducted through telephone sets provided at the scraper trap, selected mainline valve stations, and the main communications control room in the Rangely field production office.

The mobile radio system would provide voice communication for the vehicles serving the pipeline. The antennas would be mounted on the microwave towers and are expected to consist of one fiberglass-covered element, 18 inches long by 1.5 inches thick.

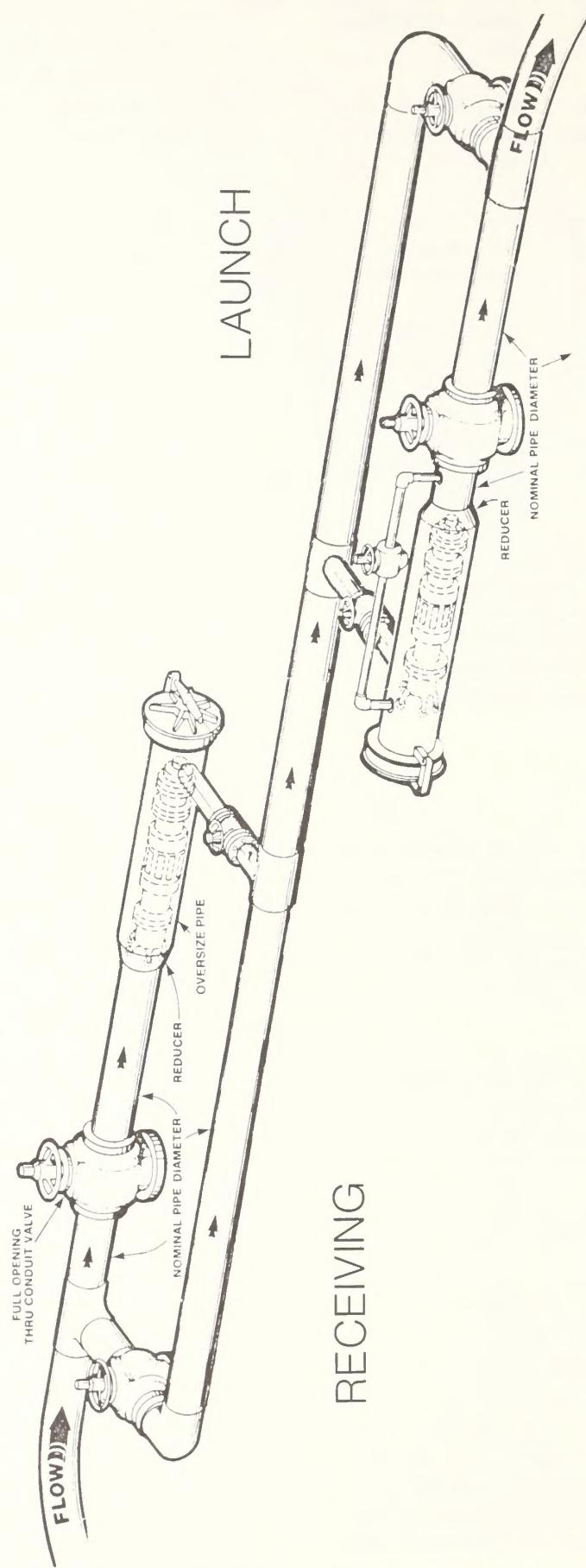


FIGURE 1-2 TYPICAL SCRAPER TRAP

NOT TO SCALE

(Tower is 30 feet in height)

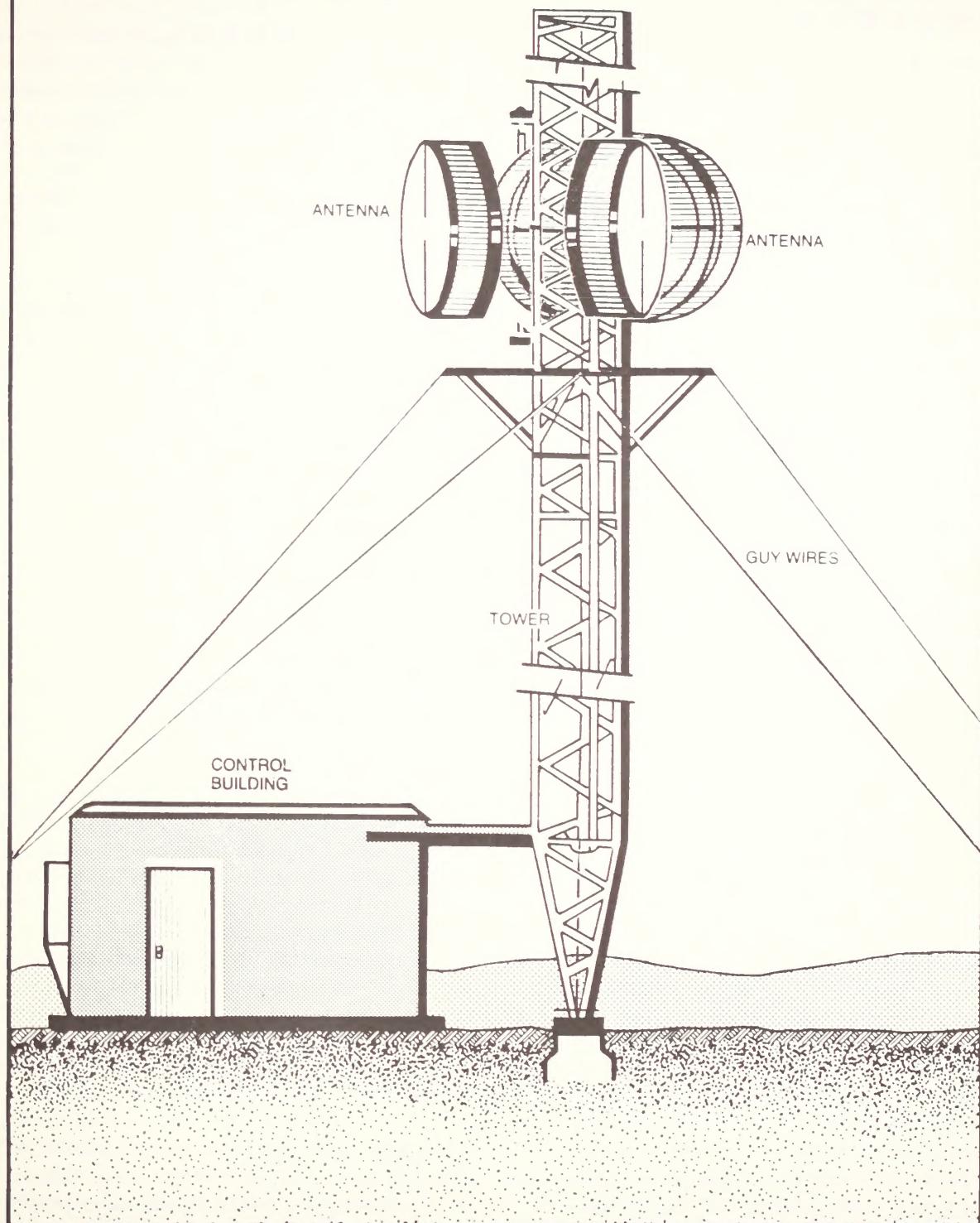


FIGURE 1-3 TYPICAL MICROWAVE REPEATER STATION

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Construction

Construction of the proposed CO₂ pipeline, scheduled to occur during 1985, would disturb a maximum of 2,535 acres of land. A projected work force of 545 would be needed during peak construction (fall 1985). Most of the unskilled laborers (50 percent of the total work force) would be hired locally. Skilled laborers, such as pipeline welders, would be hired locally or brought in from outside the area.

Pipeline construction techniques for a CO₂ pipeline are the same as for conventional pipelines. Typically, pipelines are laid in a continuous operation by a *“spread”** consisting of equipment and crews handling various phases of construction for a given pipeline segment. Three spreads would be needed to build the pipeline. Spread I would build 80 miles of pipeline, from the La Barge gas plant compressor station south to MP 80, and require 155 workers. (The maps in Appendix 1 show the mileposts for the route. The mileposting starts from the La Barge gas plant, but the EIS analyzes from the compressor station, which is 1.5 miles from the plant.) Spread II would extend 40 miles, from MP 80 to 120, and require 124 workers. This spread would begin at the top of the Red Creek Basin Escarpment, go down Jesse Ewing Canyon, cross the Green River, and go up to the head of Rye Grass Draw. This pipeline segment could be built simultaneously with the Chevron Phosphate pipeline during the summer of 1985. For this EIS, simultaneously means that the spread construction would be carried out separately for each pipeline but occur during the same summer. Activities would be merged as much as physically and contractually possible.

Spread III would extend 56 miles from MP 120 to the Rangely field compressor station (MP 176) and would require 155 workers.

The two pipeline welding and storage yards would be located at Rock Springs, Wyoming, and Vernal, Utah. The pipe and equipment would be shipped to Rock Springs via Union Pacific Railroad and to Vernal via truck from Salt Lake City. The pipe and equipment for *Spread* I and the northern half of Spread II would be hauled from Rock Springs via Interstate 80, Wyoming State Highway 372, and U.S. Highway 191 located in Sweetwater County, Wyoming. For the southern half of Spread II and Spread III, the pipe and equipment would be trucked from Vernal using U.S. Highway 191 and 40, Utah State Highway 149, and Colorado State Highway 64. Various unnumbered county and private gravel and dirt roads would be used by all spreads to provide access from the major roads to the project right-of-way.

The construction right-of-way would be 100 feet wide for Spreads I and III, and 75 feet wide for Spread II. Because Spread II would be built simultaneously with the Chevron Phosphate Pipeline Project, a 100-foot wide construction right-of-way is not needed.

Workers needed for construction at river crossings are included in the spread totals. The following is a list of major activities in order of occurrence:

- right-of-way clearing and grading;
- trenching;
- stringing, lineup, welding, and radiographic examination;
- coating and wrapping;
- lowering in;
- trench back filling;
- hydrostatic testing and tie-ins; and
- cleanup and restoration.

Normal construction practice begins by clearing and grading a 100-foot-wide pipeline right-of-way, as required, to prepare a smooth and unobstructed workpad for successive construction operations. To maintain the prescribed maximum grading in mountainous or hilly terrain, the level workpad must be cut out of the hillside; this technique is referred to as a sidehill cut. Grading for sidehill cuts begins at the uphill end of the cut and continues downward until the required working width is obtained. Spoil from the cut (uphill) is graded to fill the opposite (downhill) side of the bench where it forms part of the workpad, thereby minimizing the width of disturbed area. The slope of the cut (as well as the fill on the opposite side) depends on the angle of repose of the material being graded. The looser the material, the smaller the angle of repose and the larger the cut required for a given workpad width.

Once the working area is prepared, the trenching operation begins, which in rocky terrain may require drilling and shooting. This operation is followed by stringing, bending, line-up, welding, radiographic examination, coating, and lowering of the pipe into the trench. The pipe is lowered by a sideboom machine. In stony or rock areas, selected fill material (generally sand or smooth soil) is used to pad the bottom of the trench before the pipe is lowered. After the pipe is lowered, the fill is placed over the pipe to protect the pipe and coating material from damage. The backfill may then be completed with spoil excavated from the trench.

In hilly areas, depending on the pipeline gradient, sacks filled with sand or smooth soil may then be placed in the trench as barriers, perpendicular to the pipe at regularly spaced intervals to prevent water from running down the trench during rain storms and from washing out the backfill. When these preparations are complete,

PROPOSED ACTION PROJECT DESCRIPTION

the areas between and over the sack breakers may be backfilled with spoil excavated from the trench.

The last operation of pipeline construction is cleanup and restoration. Where the sidehill slopes are gentle, the material graded from the working width is replaced, contoured, and restored as nearly as possible to preconstruction conditions. However, in areas of steeper sidehill cuts, especially in rock, rather than recontouring, all debris from construction is removed and the working area, smoothed. Shallow trenches (6 to 9 inches deep) are dug downhill across the working width in order to divert rainwater or spring runoff. The small berms formed from the spoil from the trench further prevent water from cascading downslope and creating ruts. This method of restoration does not create a road but does provide emergency access to the sidehill slopes for pipeline maintenance and repair. Steel gates with chains and locks at the entry and exit points of these locations can be erected, if necessary, to restrict public access. The maintenance superintendent would be responsible for the keys. Restoration, reseeding, and erosion control procedures, identified in Appendix 3, would be followed as part of cleanup and restoration.

For relatively short distances in restricted or sensitive sidehill areas, the working width may be reduced to not less than 25 feet. The ditch is dug about 7 feet from the toe of the cut, leaving a working side of 18 feet. Fill from the cut is placed on the working side and graded down to allow equipment work. The fill is used later for partial restoration of the cut. Although this method reduces the amount of cut, it hampers normal construction. Since pieces of equipment cannot pass each other, staging areas must be provided at both ends of the restricted area. The method can, therefore, be used only for short sections and on a case-by-case basis.

When crossing rimrock areas including the Red Creek Basin Escarpment, efforts will be made to remove and store rimrock. When pipe installation and backfilling are completed, the rimrock will be restored to its original condition to the extent possible. The right-of-way configuration for a single pipeline would be similar to that shown on Figure 1-4.

Construction noise would be distributed over the length of the spread. Heavy equipment and construction typically produce noise levels of about 90 decibels at a distance of 50 feet, assuming a noise attenuation rate to 6 decibels (about the level of normal conversation) within 0.25 mile (BLM 1983c).

During pipeline construction, the right-of-way would be used for surface travel in areas with no access roads. For vehicle safety on the right-of-way, temporary bridges or culverts would be constructed, when war-

ranted, across creeks and gulleys on the working side of the right-of-way.

Blasting would be used for materials that cannot be ripped. In preparation for blasting, unconsolidated material would be removed from the ditch-line end and a series of holes drilled by air-powered drills. The drills are generally suspended from a sideboom tractor, which also tows the compressor supplying the air. However, self-propelled drills may be used if more blasting is required.

Where blasting is necessary, the following safety precautions will be used in all instances.

- In areas of human use, shots will be blanketed (matted);
- Landowners or tenants near the blasting area will be notified in advance so that livestock and other property can be adequately protected; and
- Before detonation, construction workers and local residents will be cleared from the blasting area.

Fences along both sides of the right-of-way will be adequately braced before wires are cut and temporary gates installed. After construction, openings will be closed using fencing of a quality at least equal to or greater than that of the original.

Topsoil will be preserved subject to agreements with landowners and the federal land managing agency. The topsoil would be cast to the working side of the right-of-way. The ditching machine would then cast the ditch spoil to the opposite or spoil side of the right-of-way so that the two soils do not mix. After construction is completed, the ditch would be backfilled, with the topsoil going in last, returning to its original position.

The depth of the ditch would vary with the conditions encountered. The cover from the top of the pipe to ground level would generally be at least 3 feet. In areas of consolidated rock, burial depth from the top of the pipe would vary from 18 to 24 inches (minimum), depending on class location as defined in American National Standards Institute (ANSI) B31.8. At highway crossings, the depth of the ditch would conform to regulations and requirements of the organization having jurisdiction. To reduce the likelihood of accidents, ditching operations would be timed so that the ditch would not remain open for an extended period. Where an open ditch would interfere with livestock trails, driveways, or rural roads, temporary crossings such as plank bridges or an unexcavated ditch line would be provided to allow safe and unimpeded passage across the right-of-way.

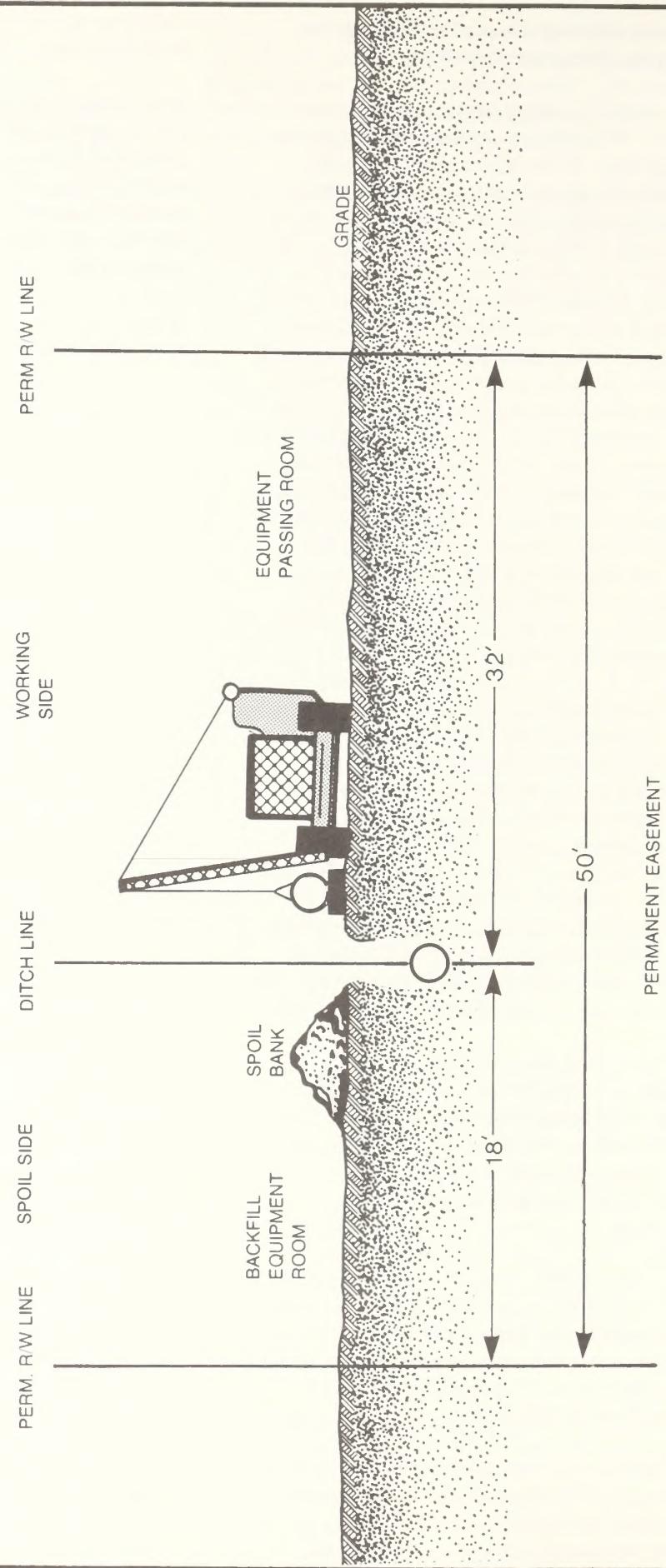


FIGURE 1-4 SINGLE PIPELINE RIGHT-OF-WAY CONFIGURATION

PROPOSED ACTION PROJECT DESCRIPTION

The proposed pipeline would cross one major perennial stream—the Green River—at MP 38, 106.5, and 143. The pipeline would be buried in a trench at these crossings. Vegetation would be cleared on each bank of the river only as needed to provide enough work space and equipment storage. A plan and profile of a typical river crossing is shown in Figure 1-5.

Construction across the Green River would occur during the period of low flow to eliminate conflicts with aquatic species, and the pipeline trench would be built to cross the river at right angles. Stream flow would be maintained at all times during construction, and the banks would be reclaimed to their original profiles and stabilized to minimize erosion.

At each crossing, the ditch would be dug by dragline or large backhoe. The pipe would be buried a minimum of 4 feet below the river bed, or deep enough so that high water would not affect the pipe through scour action. No cofferdam would be required. The gradient of the stream would be maintained by removing all spoil from the bed after construction is completed. Banks would be restored to resemble their original grade and sand-cement sacks, breakers, or *riprap* would be placed over the pipeline where necessary. The pipeline would be welded on one bank of the river before the trench is dug to reduce the time that the trench is open. The pipeline would then be placed into the trench and weighted to ensure that it remains in the trench until covered.

The pipeline would parallel and cross a portion of Red Creek through Richards Gap. This section of pipeline would be buried during low flow in a manner similar to that previously described.

At various locations, including Clay Basin, the pipeline would cross existing oil and gas fields. These fields typically are crisscrossed by large numbers of small buried and aboveground 4 to 12 inch diameter pipelines, which are generally not mapped or incompletely mapped. Construction crews must be extremely careful when working in well fields to avoid known or suspected pipelines. Work often includes digging the pipeline trenches by hand. Aboveground well field pipelines also have to be protected with earthen ramps from the crossings of large equipment.

Casing would be installed at road crossings where required by federal, state, or local authorities. A separate crew would install casings ahead of the main construction crew who would later insert the carrier pipe into the casing.

The pipeline would be cathodically protected by the pipe coating, rectifiers, and anodes. Rectifiers would be located near power distribution lines and mounted on a

pole adjacent to the right-of-way; associated anodes would be buried. The exact locations of these cathodic protection devices cannot be determined until the pipeline is installed and the proper tests conducted. Test leads would be attached to the line at fence lines, roads, and highways to monitor the cathodic protection system. Each set of test leads would be brought to the junction box that is mounted on a short post, which in turn would be installed where it would not interfere with existing land uses.

Before installation, all welds would be radiographically inspected for sections of pipe to be placed beneath highway rights-of-way, the Green River, and Red Creek, and for all piping at the Rock Springs booster station (Sand Wash Alternative). At least 10 to 75 percent of the remaining pipeline would also be radiographically inspected.

The entire pipeline would be hydrostatically tested to at least 125 percent of maximum operating pressure. The test water would be obtained through negotiations with local authorities who control the water resources. An estimated 10 acre-feet of water would be required for testing. The exact amount required would depend on the testing procedures used. The test water would be disposed of in accordance with federal, state, and local agency requirements.

Temporary headquarters for construction spreads would probably be located only in Rangely, Colorado and Rock Springs, Wyoming, but the contractor may choose to locate the headquarters in other communities. Temporary headquarters would consist of an office trailer; one or more warehouse trailers (or suitable rented space, if available); and a storage yard for pipe, other major pipeline materials, and construction equipment.

Construction workers would live in local motels, rented houses, or other lodging, and personal trailers or pickup campers parked in authorized commercial camping facilities. Camping could also occur in nondesignated campgrounds anywhere along the pipeline route. Car pools, privately owned vehicles, and other means would be used to transport workers to the construction site.

Standard construction procedures would be required to build the microwave facilities. The communication station would be located within the area disturbed by the Rangely field booster station; the transmitters would be located inside the control building. Two microwave dishes and a VHF antenna would be added to existing towers at four of the repeater stations. A crew of about 33 people would move from site to site.

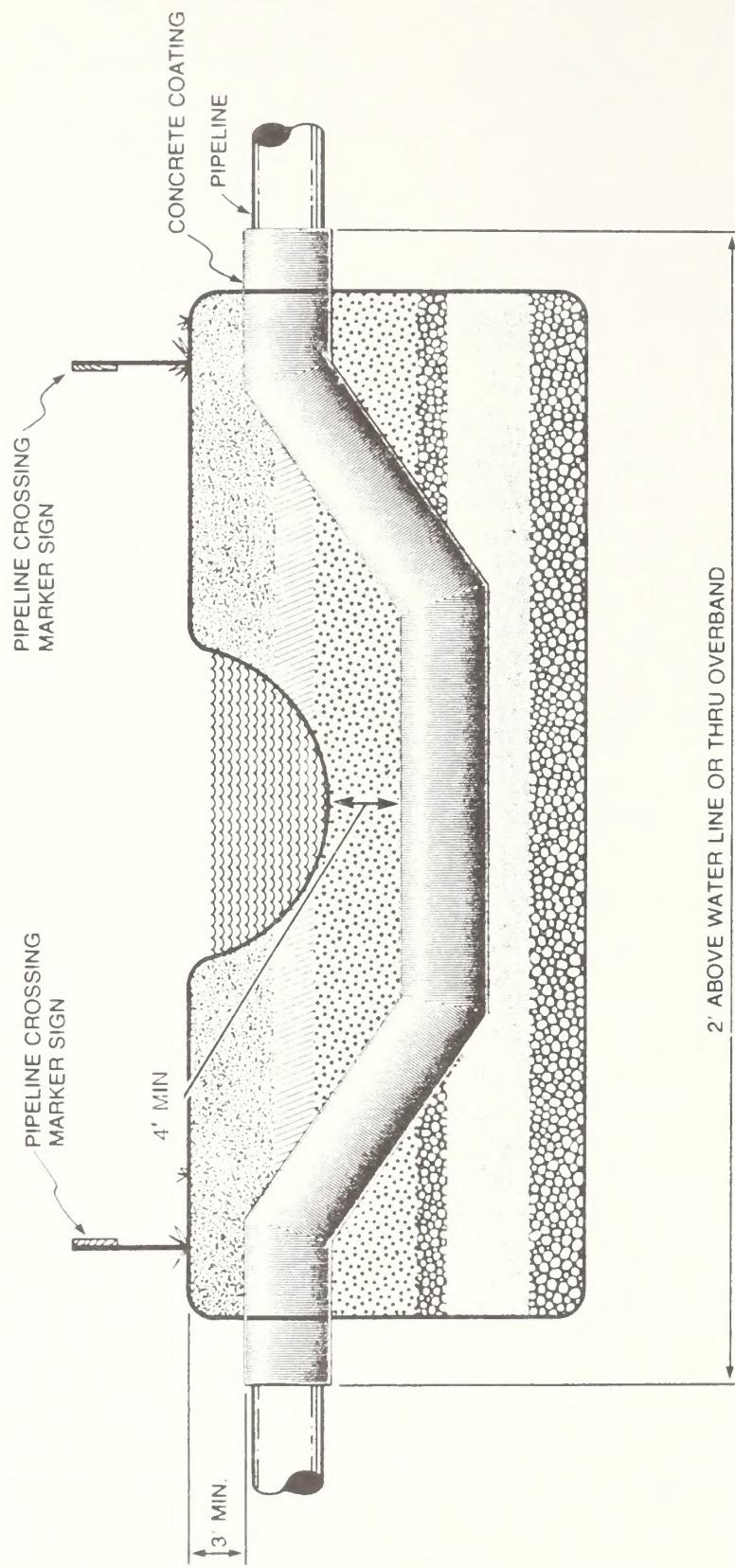


FIGURE 1-5 TYPICAL PROFILE FOR PIPELINE RIVER CROSSING

PROPOSED ACTION PROJECT DESCRIPTION

At the Raven Ridge site, new facilities would include an 8-foot-square shelter and a 30-foot-high tower with microwave dishes and a VHF antenna.

SCADA stations would be built during the summer using standard construction procedures. A crew of four would move from site to site.

The electric distribution lines would also be built during the summer. Various utility companies would have the responsibility to provide the power, depending upon where the lines would be. Usually a crew of six to seven persons, working 0.5 to 1 mile per week, would build this type of line.

Operation

A communications and control center at the Rangely field office would monitor and control pipeline operation. The control center would be attended 24 hours a day, 7 days a week, during pipeline operation.

Computers would continuously monitor pipeline pressure and flow conditions at key points. The computers would be programmed to sound an alarm whenever pressure or flow deviated; the alarm would indicate an outage or other unusual conditions in the pipeline system. Specialists and technicians would be on-call to service the pipeline at their assigned locations.

The SCADA system would monitor the temperature and pressure of the CO₂ stream as well as some maintenance conditions of the block valves. The system can detect leaks down to 2 percent total volume, or 4 million cfd. Leaks smaller than that would not be detected.

At the river crossings, one SCADA terminal would be wired to both block valves. Other block valves would have pressure monitors that would not be tied into the Rangely control room but would automatically close if line pressure drops below a predetermined point.

In the event of a pipeline break, several slight variations in detection procedures could occur, depending upon the location.

(a) SCADA system (leaks at river crossings)

A rupture under a river would result in a pressure drop that would be detected at the SCADA points. Under these conditions, an alarm would sound in the control room in Rangely, and an operator would close the block valves by remote control.

- maximum time to shut valves 15 minutes

- in-flow within that time 2 million cubic feet
- maximum distance between valves 2.25 miles
- inventory within that length 7 million cubic feet
- total volume lost (maximum) 9 million cubic feet

(b) SCADA system remote automatic shut-off valves (leaks at remote locations).

A leak in a remote location along the pipeline would result in the closure of both automatic valves and the SCADA-controlled valves. This system is the same as identified for the SCADA system (leaks at river crossings). A remote leak would be observed first at the SCADA points, and an operator would shut down the SCADA-controlled valves. When pressure around the leak dropped far enough, the automatic valves would shut, finally isolating the leak.

- maximum time to shut valves 1 hour
- in-flow within that time 8 million cubic feet
- maximum distance between valves 20 miles
- inventory within that length 61 million cubic feet
- total volume lost (maximum) 69 million cubic feet

- (c) Automatic shut-off valves (leaks at river crossings).

A rupture under a river crossing protected only by automatic valves would probably be observed in the same manner as a leak in a remote location. The response by the local automatic block valves may be quicker but for analysis, a 1-hour time period was used. Less volume would be lost in this situation than with a leak in a remote location (b).

(a) SCADA system (leaks at river crossings)

- maximum time to shut valves 1 hour
- in-flow within that time 8 million cubic feet
- maximum distance between valves 2.25 miles
- inventory within that length 7 million cubic feet
- total volume lost (maximum) 15 million cubic feet

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Although CO₂ is not a hazardous gas, under the following certain conditions it could be.

- periods of no wind in very stable cold dry air,
- areas with relatively high populations of people and animals,
- low-lying land such as a river bottom, or
- massive leakage of CO₂ from complete rupture of the pipeline.

Should a leak occur under the above conditions, the event would probably be noticed because of the high noise levels produced by the escaping gas. Gas concentrations near a rupture would be high. The exact concentration would depend on how fast the CO₂ could go from a highly compressed state, rapidly expanding and absorbing heat from the atmosphere, to a gaseous state at ambient temperature. The gas would be slightly heavier than air. Death by asphyxiation could occur if humans were enveloped by massive concentrations of CO₂ or if animals were trapped by a fence or other obstruction when CO₂ concentrations were high.

In general, cleanup would not be necessary because the CO₂ would disperse into the atmosphere. Any physical damage from the rupture of the pipe would be cleaned up after that portion of the line had been repaired. Cleanup and restoration procedures would be determined in collaboration with landowners and agencies having jurisdiction.

The Rock Springs scraper trap would operate completely unattended. Employees would work at this location only when the pipeline was being cleaned or inspected.

Maintenance and Abandonment

The right-of-way would be inspected every 6 months by an aerial patrol. Surface traffic would be limited to workers performing valve maintenance or emergency repairs on the pipeline or corrosion-control devices. The pipeline would be maintained, as required, using local contractors specializing in this type of work.

When the project ended in 30 to 35 years, all surface facilities would be removed and the disturbed acreage reclaimed according to the measures identified in Appendix 3.

SAND WASH ALTERNATIVE

This alternative would be the same as the Proposed Action route from the La Barge gas plant site to MP 63. From MP 63 the pipeline would head southeast

into Colorado, turn south and then southwest to the Rangely Weber Sand Unit oil field for a total length of 211 miles (Map 1-1). A booster station would be located near Rock Springs at MP 52, with an additional scraper trap located at MP 122. The alternative would cross the Green River at MP 38, the Little Snake River at MP 152, and the Yampa River at MP 160.5.

At MP 160, the alternative would cross 0.4 mile of a power site withdraw to the Federal Energy Regulatory Commission (FERC) for a possible reservoir. FERC would add any stipulations to the right-of-way grant needed to protect the power values.

The alternative would parallel existing roads or pipelines for 192.5 miles or 91 percent of the total length. The existing facilities include Wyoming State Highway 376 from MP 13 to 38; the Trailblazer natural gas pipeline between MP 38 and 52; the Mountain Fuel pipeline between MP 52 and 59; the MAPCO liquid hydrocarbon line between MP 59 and 63; dirt roads from MP 63 to 71; Mountain Fuel pipeline from MP 71 to 122; dirt roads from MP 122 to 165, except for several short stretches totaling 5.5 miles; and the AMOCO pipeline from MP 165 to 211.

CO₂ Pumping Facilities

The Rock Springs booster station would be located in section 24, Township 18 North, Range 106 West, 0.5 mile from Highway 191. Power for the booster station would be purchased from Pacific Power and Light. A distribution line about 0.5-mile-long would follow the access road. The station would have a centrifugal pump driven by an electric motor and two 1,000-horsepower units operating at 4,160 volts each. One of the units would be used as a spare to allow periodic maintenance during continuous operation.

The booster station would include the following major facilities:

- Pump house: A facility that would house the mainline pumps and drivers, miscellaneous piping systems, sumps, a control room, water cooling pumps, electric motor control and switchgear, inhibitor system, and station maintenance facilities.
- Electric substation: A facility that would link the power source and the load center, including transformers and other associated electrical equipment.
- Waste treatment: A septic tank that would be used for disposing sanitary wastes.

SAND WASH ALTERNATIVE

A plot plan of the booster station is shown on Figure 1-6. All exposed structures would be designed to reduce visibility of forms and material types, textures, and colors.

Block Valves and SCADA Terminals

Mainline block valves would be placed at 15- to 20-mile intervals along the pipeline. Block valve pairs would be installed at the crossing of the Green River at MP 38 and the Yampa River at MP 159.7 and 160.5. In addition, a total of four SCADA terminals would be installed. Power would be provided for each SCADA terminal using 15 kV power distribution lines.

SCADA terminal 1	MP 38	Green River	3-mile-long, 15 kV power distribution line
SCADA terminal 2	MP 52	Rock Springs	0.5-mile-long, 15 kV power distribution line
SCADA terminal 3	MP 111	Scraper Trap Station	less than 1-mile-long, 15 kV power distribution line
SCADA terminal 4	MP 160.5	Yampa River	5-mile-long, 15 kV power distribution line

A scraper trap pair would be located at MP 111.

Construction methods, the communication system, equipment, and the microwave terminal station would be the same as described for the Proposed Action. The repeater stations would be located at Wilkins Peak, Aspen Mountain, Lookout Mountain, Juniper Mountain, and Raven Ridge.

The two pipe welding and storage yards would be located at Rock Springs, Wyoming and Craig, Colorado. The pipe and equipment would be shipped to Rock Springs via the Union Pacific Railroad and to Craig via the Denver and Tio Grande Western Railroad. The pipe and equipment for Spread I and the northern half of Spread II would be hauled from Rock Springs via Interstate Highway 80, Wyoming State Highways 372 and 430; US Highway 191; and Moffat County Roads 4, 67, and IR6. For the southern half of Spread II and Spread III, the pipe and equipment would be hauled from Craig via US Highway 40, Colorado State Highway 318, Moffat County Roads 67 and 85, and Rio Blanco County Road 1. Various unnumbered county and private gravel and dirt roads would be used by all spreads to provide access from the major

roads to the project right-of-way. The booster station near Rock Springs would be built from June 1985 to January 1986, using standard construction practices. About 3 acres would be disturbed, and about 38 workers would be required during peak construction.

At the first four sites, only two more dishes and a UHF antenna would be added to each tower. At the Raven Ridge site, new facilities would include an 8-foot-square shelter and a 30-foot-high tower with microwave dishes and VHF antenna. A typical terminal or repeater station would include the equipment shown on Figure 1-3.

The Sand Wash Alternative would involve federal, state and private lands. Appendix 4 indicates the miles that would be disturbed by land status, ownership, and management. The Sand Wash Alternative would disturb land under the following ownership or management:

- 1,587.6 acres of land managed by BLM
- 781.2 acres of private land
- 103.2 acres of land owned by the State of Colorado
- 55.2 acres of land owned by the State of Wyoming
- 4.8 acres of land managed by the Fish and Wildlife Service (Seedskadee National Wildlife Refuge)

NO-ACTION ALTERNATIVE

The No-Action Alternative involves the denial of the requested rights-of-way for the CO₂ pipeline and Rock Springs booster station. No CO₂ pipeline or ancillary facilities would be built across federal lands from the La Barge gas plant site in Wyoming to Rangely, Colorado. The CO₂ would not be carried from the La Barge gas plant to the Chevron USA, Inc., Rangely Weber Sand Unit oil field for enhanced oil recovery.

Chevron could use CO₂ from Cortez, Colorado. The *Cortez to Rangely CO₂ Pipeline EIS*, being prepared by the BLM Grand Junction District, analyzes a CO₂ pipeline from Cortez to Rangely proposed by Shell Pipeline Corporation. Other options could be other CO₂ sources in Utah. In order for these sources to be used, Chevron or another company may have to file a right-of-way application, and BLM would have to analyze the proposal and process the application. Without access to one of these sources, Chevron could not use CO₂ for enhanced oil recovery because trucking CO₂ was determined to be impractical. (See the following discussion of

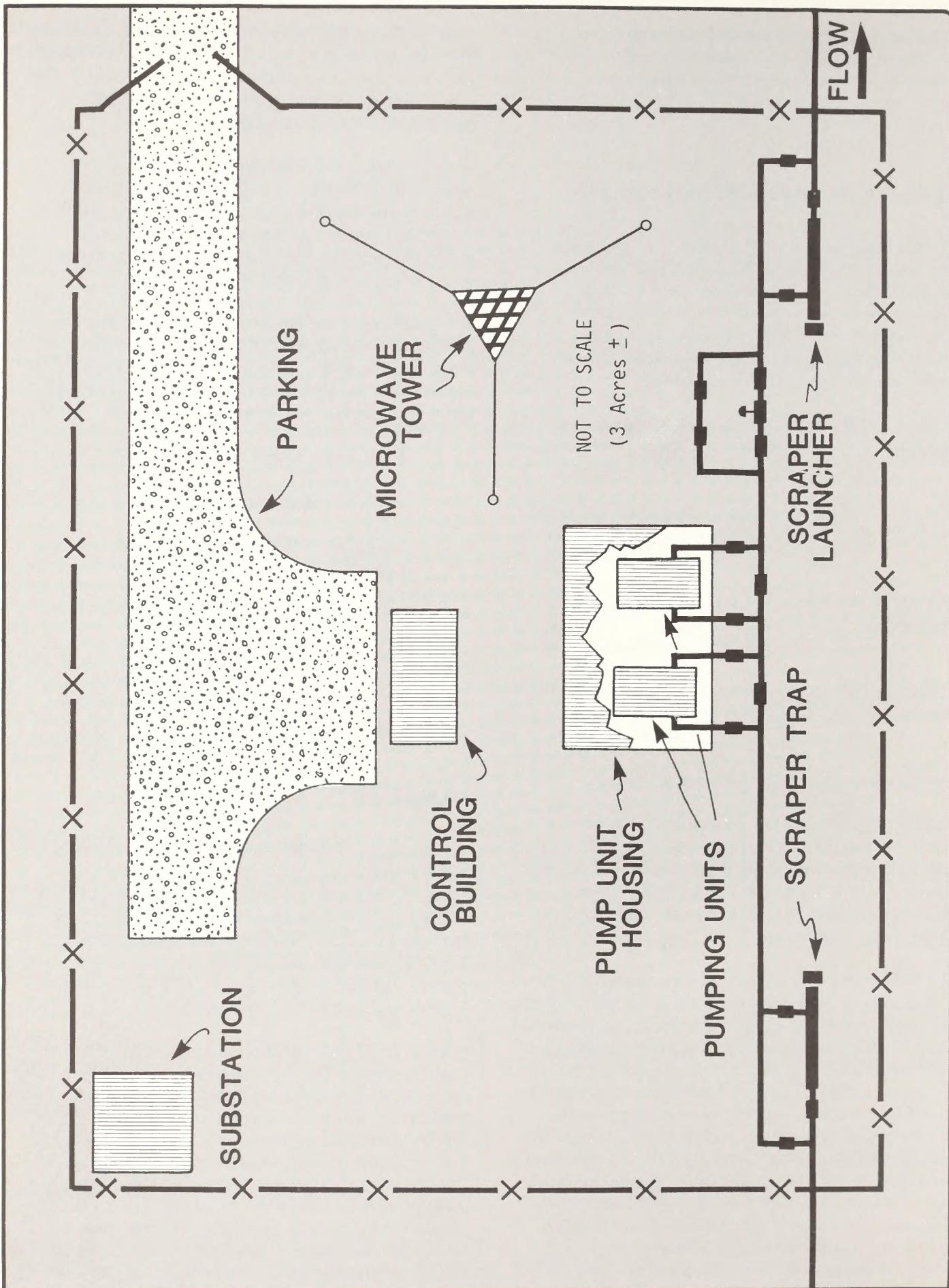


FIGURE 1-6 ROCK SPRINGS BOOSTER STATION

ALTERNATIVES CONSIDERED BUT ELIMINATED

Alternatives Considered but Eliminated from Detailed Analysis for reasons.)

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following alternatives were considered but eliminated from detailed analysis in this EIS. Map 1-2 shows where these alternatives would have been located.

Truck Transportation of CO₂

Transporting CO₂ from any of its existing sources would require 580 trucks each day at a frequency of one truck every 2 to 3 minutes. The existing roads could not handle this traffic volume and would need to be expanded. In addition to the impacts from road construction and maintenance, road safety and the costs of trucking CO₂ were also considered in eliminating this alternative.

Alternative A

This alternative was dropped from detailed study because it would have been considerably longer, thus causing more disturbance. It also would have crossed Interstate Highway 80 twice, railroad lines twice, the Hams Fork River, utility corridors, and various historic trails several times. Alternative A would not have had any environmental advantages over the Proposed Action.

Alternative B

This alternative was dropped from further study because it offered no environmental advantage over the Proposed Action. In addition, this alternative would have crossed the Black Fork River and the Oregon and Emigrant Historic trails several times.

Alternative C

This alternative was dropped from detailed study because it offered no environmental advantages over the Proposed Action. It would have been longer, would have crossed a trona mining area, and would have passed through areas containing numerous cultural resource sites.

Alternatives D & E

These alternatives, as originally analyzed, were similar to the Sand Wash Alternative and differed from each other only in origin. The route was refined and is now represented by the Sand Wash Alternative.

Alternative F

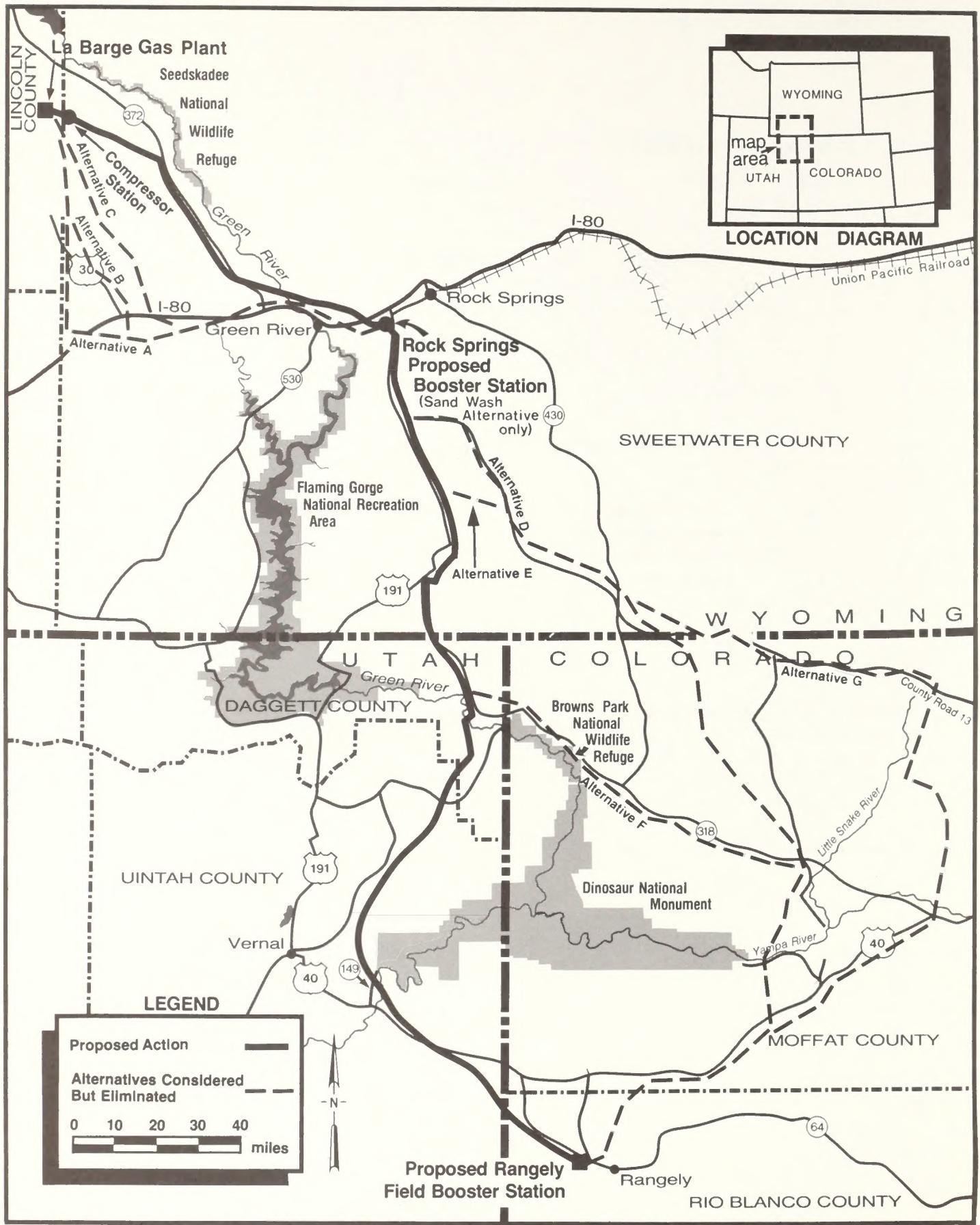
This alternative was dropped from detailed study because it would not avoid the issue areas identified for the Proposed Action, and it would pass through a short section of the Browns Park National Wildlife Refuge and through the residential area of Browns Park. Also, this alternative would have been considerably longer than the Proposed Action.

Alternative G

This alternative would have been extremely long compared to the Proposed Action. Although Alternative G would have followed existing paved and dirt roads, its additional length would have caused more environmental disturbance. The alternative did not offer any environmental advantages over the Proposed Action.

DATA SUMMARY TABLES

The Proposed Action and Sand Wash Alternative would each temporarily disturb some of the lands they crossed and would remove other lands for the life of the project. Tables 1-3 and 1-4 summarize the acres disturbed and reclaimed.



DATA SUMMARY TABLES

TABLE I-3
PROPOSED ACTION ACRES DISTURBED AND RECLAIMED

Spread	Milepost		Distance (miles)	Width (feet)	Acres per Mile	Disturbed ¹	Reclaimed ²
1	0	80	80	100	12	960	960
2	80	120	40	75	9	360	360
3	120	176	56	100	12	672	672
TOTAL:			176			1,992	1,992

¹Amount of acreage disturbed during construction (short term). (No acreage would be removed for the life of the project.)

²Amount of acreage returned to preconstruction/vegetation density upon completion of construction.

TABLE I-4
SAND WASH ALTERNATIVE ACRES DISTURBED, RECLAIMED, AND REMOVED

Spread	Milepost		Distance (miles)	Width (feet)	Acres per Mile	Disturbed ¹	Reclaimed ²	Removed ³
1	0	80	80	100	12	960	960	0
Compressor Station	--	52.3	--	--	--	3	0	3
Subtotal:			80			963	960	3
2	80	140	60	100	12	720	720	0
3	140	211	71	100	12	852	852	0
TOTAL:			211			2,535	2,532	3

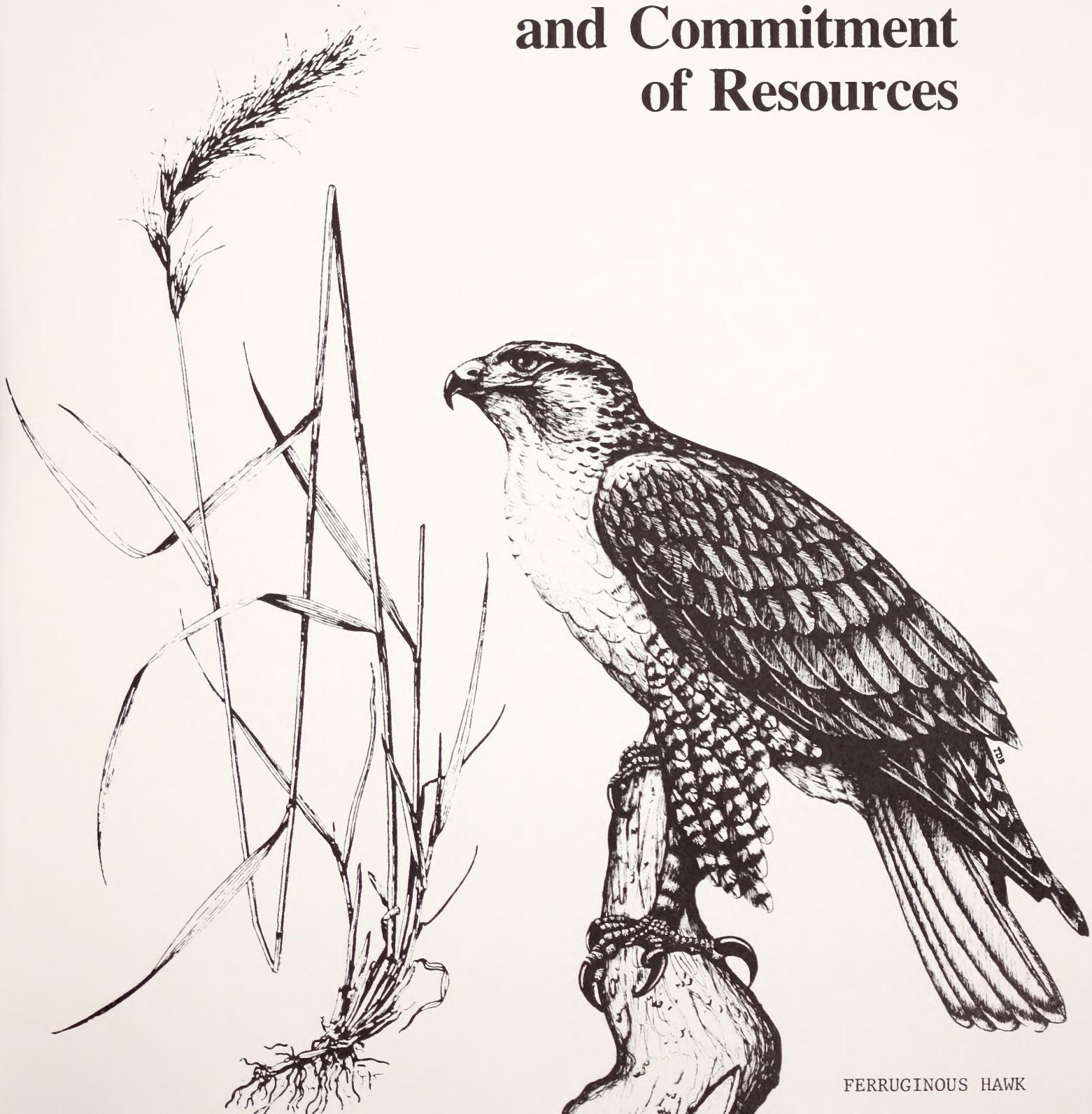
¹Amount of acreage disturbed during construction (short term).

²Amount of acreage returned to preconstruction/vegetation density upon completion of construction.

³Amount of acreage removed for the life of the project.

Chapter 2

Affected Environment and Environmental Consequences and Benefits, Trade-Offs, and Commitment of Resources



FERRUGINOUS HAWK

CHAPTER 2

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES, AND BENEFITS, TRADE-OFFS, AND COMMITMENT OF RESOURCES

The affected environment and environmental consequences of implementing the Proposed Action and Sand Wash Alternative are discussed in this chapter. The affected environment is defined as the baseline conditions that would be affected by the Proposed Action. Baseline conditions assume normal growth and changes are occurring in the study area. The areal extent of the affected environment varies for individual environmental elements depending on how far-reaching the significant, direct and indirect impacts (environmental consequences) of the proposed project would be for each element.

The environmental consequences of the Proposed Action and the Sand Wash Alternative are discussed at a level of detail corresponding to the degree or severity of impact. Significant impacts are discussed in detail; insignificant impacts are summarized.

The following are not discussed in this chapter because they would not be significantly affected by construction or operation of the Proposed Action or the Sand Wash Alternative:

- federally listed threatened and endangered plant species, geological resources, sole sources of drinking water, prime and unique farmland, and health and safety.

Impacts to quality of life and air quality from the Proposed Action would be the same as from the Sand Wash Alternative. No impacts to paleontological resources are anticipated from implementation of the Sand Wash Alternative. Therefore, no separate discussions for quality of life, air quality, or paleontological resources appear under the Sand Wash Alternative section of this chapter.

The impact analyses assume certain types of mitigation would be implemented that would alleviate or minimize adverse impacts. These types of mitigation include mitigation measures incorporated in the applicants' proposed plans of operations. These measures are committed to by the applicant and described in Appendix 3.

PROPOSED ACTION

Socioeconomics

IMPACT SIGNIFICANCE CRITERIA

Socioeconomic impacts were considered significant if changes in the following were 5 percent or more:

- population of a community;
- total employment, total personal income, or per capita personal income of a county;
- total revenue of a county or school district; or
- requirements for additional capacity, personnel, or equipment for any type of *infrastructure.*

AFFECTED ENVIRONMENT

The area of influence for population, employment, and income analyses includes: Green River and Rock Springs, Sweetwater County, Wyoming; Vernal, Uintah County, Utah; Craig, Moffat County, Colorado, and Rangely, Rio Blanco County, Colorado.

Chevron has estimated that about 15 percent of the workers would camp at undetermined locations near the pipeline route. (Refer to Appendix 5 for description of the gravity model used to determine the area of influence.)

The area of influence for revenue analyses include the following counties and school districts:

- Lincoln County, Wyoming
- Lincoln County School District 1
Kemmerer, Wyoming

Editor's Note: Words or phrases enclosed by asterisks are defined in the Glossary.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

- Sweetwater County, Wyoming
- Sweetwater County School District 1
Rock Springs, Wyoming
- Sweetwater County School District 2
Green River, Wyoming
- Daggett County, Utah
- Daggett County School District, Utah
- Uintah County, Utah
- Uintah County School District, Utah
- Rio Blanco County, Colorado
- Rio Blanco County School District 4,
Rangely, Colorado

Population, employment, income, and housing in the area of influence rapidly increased during the 1970s because of energy developments. However, changes in the nation's energy situation and stabilization of trona development in Sweetwater County have sharply reduced the rate of growth in the current decade. Population in the area of influence is expected to increase 2 percent per year between 1982 and 1990 (Appendix 5, Baseline population sources).

DIRECT IMPACTS

Pipeline Construction. Construction of the Proposed Action would not cause any significant impacts. (Refer to Tables 2-1 and 2-2 for data relating to population, employment, income, and revenue.) In 1985, population is expected to increase from 2 percent in Green River, Vernal, and Rangely to less than 1 percent in Craig because of construction. Total employment and personal income growth would vary from 2 percent in Uintah and Sweetwater counties to less than 1 percent in Moffat County. Per capita personal income would increase 2 percent in Uintah County and less than 1 percent in the other counties. Property tax revenue would rise 2 to 3 percent in the Daggett County jurisdictions and less than 1 percent in all other jurisdictions. All of these impacts fall below the 5 percent significance criteria.

Project Operation. Since pipeline operation would require only 10 to 20 workers, the operation itself would not cause any significant long-term impacts. However, transportation of CO₂ to Rangely would increase annual oil production in the Rangely Weber Sand Unit oil field and the unit's life, providing significant economic benefits to Rio Blanco County, Rangely, and the Rangely School District. Tables 2-3 and 2-4 show the

impacts from additional oil production. Average annual oil production would increase 28 percent in Rio Blanco County and 14 percent in Colorado. These increases would add 18 percent to the Rio Blanco County tax revenue, 26 percent to Rio Blanco County School District 4, and 10 percent to Rangely.

Population, total employment, and total personal income impacts identified in Tables 2-3 and 2-4 represent losses that would be avoided from 2000 to 2010 by extending the life of the Rangely Weber Sand Unit oil field. Without that extension, Rangely would experience a population loss of up to 530 (15 percent) by 2000 and equivalent declines in employment, income, business activity, and tax revenues. The losses avoided in Rangely would be smaller than these estimates because many oil field workers live elsewhere or are members of traveling crews. Estimates derived from an analysis of northwest Colorado's oil and gas industry in 1980 indicate that only 25 percent of the drilling crew workers (one-third of total oil and gas employment) live in Rangely, with nearly half coming from Vernal and the remainder from Grand Junction (Mountain West Research—Southwest, Inc. undated). However, social and economic strains from high unemployment, workers and their families being forced to move elsewhere, business failures, and changes to a more rural lifestyle would also occur. Although these impacts would only be postponed, the area would have an additional 10 years in which to seek solutions.

CUMULATIVE IMPACTS

When combined with the interrelated projects described in Chapter 1, the Proposed Action would significantly affect Lincoln and Sweetwater counties and Rock Springs (Tables 2-1 and 2-2).

In 1985, the cumulative impacts of the Proposed Action and the interrelated projects would increase Rock Springs' population by 10 percent, Sweetwater County employment and total personal income by 9 percent, and Lincoln County revenue by 12 percent. All of these impacts would be considered significant, short-term (approximately 8 months) impacts, because they exceed the 5 percent significance criteria.

Some impacts to infrastructure would occur in Sweetwater County and Rock Springs. However, the majority of these impacts would be mitigated by the permit conditions applied to the Chevron Phosphate Project by the State of Wyoming, Office of Industrial Siting Administration (ISA) (BLM 1983e). The remaining cumulative impacts would be less than the 5 percent significance criteria.

PROPOSED ACTION—SOCIOECONOMICS

TABLE 2-1
**EFFECTS TO POPULATION, EMPLOYMENT, AND INCOME FROM
 CONSTRUCTION OF THE PROPOSED ACTION**

County	Baseline	Proposed Action	Interrelated Projects	Percent above Baseline Proposed Action	Percent above Baseline Cumulative
Population					
Sweetwater County	44,739	550	1,930	N/A	N/A
Green River	13,672	230	190	1.7	3.1
Rock Springs	20,812	270	1,680	1.3	9.4
Uintah County	24,000	190	0	N/A	N/A
Vernal	7,800	140	0	1.8	1.8
Moffat County	14,524	30	0	N/A	N/A
Craig	10,000	25	0	0.2	0.2
Rio Blanco County	7,246	50	0	N/A	N/A
Rangely	2,440	40	0	1.6	1.6
Total Employment					
Sweetwater County	22,670	360	1,540	1.6	8.4
Uintah County	10,041	220	0	2.2	2.2
Moffat County	6,769	40	0	0.6	0.6
Rio Blanco County	3,844	50	0	1.3	1.3
Total Personal Income¹					
Sweetwater County	\$559,100	\$7,860	\$43,950	1.4	9.3
Uintah County	204,900	5,030	0	2.5	2.5
Moffat County	153,600	820	0	0.5	0.5
Rio Blanco County	75,200	1,160	0	1.5	1.5
Per Capita Personal Income					
Sweetwater County	\$12,497	\$12,519	\$12,938	0.2	3.5
Uintah County	8,538	8,678	8,678	1.6	1.6
Moffat County	10,576	10,610	10,610	0.3	0.3
Rio Blanco County	10,378	10,466	10,472	0.8	0.8

See Appendix 5 for data sources and analysis methods.

¹Figures are represented in thousands of dollars.

N/A = not applicable; the significance of population increase is measured for communities that have to provide the facilities and services.

Although the cumulative impacts would cause a significant population increase in Rock Springs, the effects on quality of life would not be significant. Community social structures have already become more formalized, impersonalized, and segmented from previous growth, and little further change should occur. Local attitudes

favor economic development in order to relieve the current recession and unemployment.

Many construction and operation workers could be hired locally, easing the current, high unemployment. Operation work forces for the Chevron Phosphate and

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-2
EFFECTS TO LOCAL GOVERNMENT REVENUE FROM
CONSTRUCTION AND OPERATION OF THE PROPOSED ACTION

County/School District	Baseline *	Proposed Action*	Interrelated Projects*	Percent above Baseline	
				Proposed Action	Cumulative
Construction (1985)					
Lincoln County	\$ 5,353	\$ 18	\$ 628	0.3	12.1
Lincoln County School					
District 1	5,674	14	4	0.2	0.3
Sweetwater County	18,257	18	112	0.1	0.7
Sweetwater County School					
District 1	26,062	19	599	0.1	2.4
Sweetwater County School					
District 2	12,782	43	0	0.3	0.3
Daggett County	572	11	0	1.9	1.9
Daggett County School					
District	1,036	32	0	3.1	3.1
Uintah County	10,285	20	0	0.2	0.2
Uintah County School					
District	21,090	71	0	0.3	0.3
Rio Blanco County	5,219	**	0	**	**
Rio Blanco County School					
District 4	3,592	1	0	**	**
Operation (1990)					
Lincoln County	13,968	2	579	**	4.2
Lincoln County School					
District 1	18,576	2	428	**	2.3
Sweetwater County	18,990	31	248	0.2	1.5
Sweetwater County School					
District 1	26,840	19	937	0.1	3.6
Sweetwater County School					
District 2	13,290	88	0	0.7	0.7
Daggett County	610	11	0	1.8	1.8
Daggett County School					
District	1,100	30	0	2.7	2.7
Uintah County	12,550	29	0	0.2	0.2
Uintah County School					
District	25,730	104	0	0.4	0.4
Rio Blanco County	6,680	3	0	**	**
Rio Blanco County School					
District 4	4,240	7	0	0.2	0.2

See Appendix 5 for data sources and analysis methods.

* Figures are represented in thousands of dollars.

**Less than \$500 or 0.05 percent

PROPOSED ACTION—SOCIOECONOMICS

TABLE 2-3
**EFFECTS TO POPULATION,
EMPLOYMENT, AND INCOME FROM
ADDITIONAL OIL PRODUCTION**

Characteristic	Baseline	Proposed Action	Percent above Baseline
Annual oil production¹			
Rio Blanco County	15,545	4,420	28.4
Colorado	30,545	4,420	14.5
United States	3,159,440	4,420	0.1
Population:			
Rangely	3,490	530	15.2
Total employment:			
Rio Blanco County	6,250	280	4.5
Total personal income:			
Rio Blanco County ²	\$ 122,000	5,750	4.7

See Appendix 5 for data sources and analyses methods.

¹Production figures are represented in thousands of barrels.

²Income figures are represented in thousands of dollars.

La Barge Gas Plant projects would be required after the projects are constructed, reducing the likelihood of post-construction slump. The majority of infrastructure impacts would be mitigated by the ISA permit conditions for the Chevron Phosphate Project (Appendix 3).

When construction jobs end and are replaced by operation jobs, some social impact would occur. Some construction workers would need to find other jobs and would leave the area. Such changes are familiar and accepted occurrences to most workers and their families in construction occupations. However, a small number of workers and their families could have difficulty in making that transition.

SUMMARY OF IMPACTS

Construction of the Proposed Action would not cause any significant, direct impacts because all impacts would be less than the significance criteria. However, operation of the Proposed Action would cause significant, direct, beneficial impacts to economies affected by the Rangely Weber Sand Unit oil field for the following reasons:

- The Proposed Action would allow annual oil production increases of 28 percent in Rio Blanco County and 14 percent in Colorado.
- Oil-related tax revenues would be increased 18 percent in Rio Blanco County, 26 percent in Rio Blanco County School District 4, and 10 percent in Rangely.
- By extending the field's life, the Proposed Action would postpone a 15 percent population loss in Rangely and equivalent losses in employment, income, business activity, and tax revenues.

Combined with the interrelated projects, the Proposed Action would contribute to the following significant, cumulative impacts:

TABLE 2-4
TAX REVENUE FROM ADDITIONAL OIL PRODUCTION

Location	Baseline	Property Taxes	Severance Tax	Federal Royalty	Total	Percent Above Baseline
United States	\$ 617,760,000	\$ 0	\$ 0	5,123	5,123	*
Colorado	2,171,211	0	5,428	4,323	9,751	0.4
Rio Blanco County	8,480	674	53	800	1,527	18.1
Rio Blanco County						
School District 4	5,140	1,328	0	0	1,328	25.8
Rangely	1,760	0	180	0	180	10.2

See Appendix 5 for data sources and analyses methods.

*Less than 0.05 percent.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

- Population growth of 9 percent in Rock Springs;
- Employment growth of 8 percent and personal income growth of 9 percent in Sweetwater County; and
- Growth in tax revenue of 12 percent in Lincoln County.

Cumulative impacts to housing, infrastructure, and the quality of life would not be significant because Rock Springs and Sweetwater County have sufficient housing and infrastructure and have previous experience in handling growth problems.

Wildlife

IMPACT SIGNIFICANCE CRITERIA

Terrestrial Wildlife. Impacts to terrestrial wildlife species and habitats were considered significant if:

- any crucial habitats (seasonal ranges, calving/fawning areas, brooding areas, *leks, * raptor nesting areas, migration routes, riparian areas, etc.) were disturbed during the normal season of use;
- more than 1 percent of the total habitat within a 1-mile-wide corridor was disturbed; or
- increases in poaching, wanton killing, and harassment exceeded 15 percent over present levels.

Aquatic Wildlife. Downstream impacts to aquatic species were considered significant if:

- instream construction activities persisted in a flowing stream for more than 8 consecutive hours, occurred within a 2,000-foot radius of a spawning area, or crossed a spawning area;
- carbon dioxide (CO₂) released into the Yampa or Green River exceeded tolerance levels of 15 parts per million for major species; or
- levels of sediment in the major rivers increased more than 10 percent over current levels in a spawning area.

Threatened or Endangered Species. Impacts to threatened or endangered species were considered significant if:

- any threatened or endangered or sensitive wildlife species were affected.

AFFECTED ENVIRONMENT

The species selected for analyses are representative of species common or important to the project area. The Proposed Action would cross:

- 40 miles, pronghorn fawning range	MP 2-12 MP 18-38 MP 88-98
- 57 miles, pronghorn winter range	MP 18-61 MP 63-64 MP 88-98 MP 101-104
- 20 miles, mule deer fawning range	MP 80-100
- 56 miles, mule deer winter range	MP 37-48 MP 63-67 MP 69-72 MP 80-110 MP 129-137
- 4 miles, elk calving grounds	MP 99-101 MP 109-111
- 51 miles, elk winter range	MP 57-62 MP 63-102 MP 108-111 MP 128-132
- 41 miles of sage grouse breeding/nesting habitat	MP 8-12 MP 18-22 MP 25-29 MP 32-37 MP 69-74 MP 80-82 MP 87-93 MP 97-101 MP 119-126
- 33 miles of raptor habitat	MP 14-17 MP 22-27 MP 36-43 MP 45-46 MP 47-50 MP 143-144 MP 153-166
- 29 miles of whitetail prairie dog colonies	MP 2-7 MP 14-15 MP 21-25 MP 137-139 MP 145-149 MP 151-161 MP 164-165 MP 167-169

PROPOSED ACTION—WILDLIFE

Terrestrial Wildlife. Pronghorn, mule deer, and elk winter ranges are areas used from December 15 through April 1 during normal winters. Within these normal winter ranges are areas that are crucial to the survival of certain big game animals during heavy snowfall winters. These areas provide factors such as food and cover that are essential to the survival of the species under consideration. Fawning and calving habitats are small but provide the necessary seclusion from outside disturbance, isolation from others of the same species, and important hiding cover for the doe or cow and her newborn young.

Sage grouse, which are important as game birds, are common throughout much of the project area. A sage grouse lek is the center of the breeding and nesting activities. The majority of the nests (59 to 89 percent) can be found within a 2-mile radius of a lek (Braun and others 1977). The normal strutting and nesting period is from March 1 through June 30. Disturbance during this period could affect the production of young and the survival of the existing population.

The pipeline would pass within 2 miles of at least 15 known sage grouse strutting grounds (leks) as shown on Maps A1-5 and A1-6 (Appendix 1). In addition, more leks probably exist in the study area but have not yet been identified.

The project area is inhabited by large numbers and varieties of raptors. Nesting raptors include the golden eagle, red-tailed hawk, Swainson's hawk, ferruginous hawk, harrier, prairie falcon, merlin, kestrel, great-horned owl, and burrowing owl. The golden eagle, prairie falcon, ferruginous hawk, merlin, and burrowing owl are considered migratory birds of high federal interest and require special consideration. The ferruginous and Swainson's hawks are under review for possible listing as threatened or endangered species (*Federal Register* 1982).

Aquatic Wildlife. The Proposed Action pipeline would cross the Green River three times between the La Barge gas plant and the Rangely Weber Sand Unit oil field. Fish species include brown and rainbow trout and the endangered Colorado squawfish and humpback chub. The pipeline near mileposts (MP) 38 and 107 would cross excellent trout waters populated by brown and rainbow trout (FWS 1978). The Green River (MP 38) is also a migration route for Kokanee salmon on their way to spawn near Fontenelle Reservoir. The pipeline (MP 143) would cross the upper reaches of one of the most important nursery habitat areas of juvenile Colorado squawfish in the Green River (Miller and others 1982a).

Threatened and Endangered Species. The Proposed Action would cross known and probable habitats of

several listed endangered species including the black-footed ferret, whooping crane, peregrine falcon, bald eagle, Colorado squawfish, and humpback chub. (See Appendix 6 for Section 7 endangered species list.) Several recorded, confirmed and unconfirmed reports of black-footed ferrets within the project area have been collected, dating from the 1930s (Clark 1976). The black-footed ferret could be found along any portion of the route where whitetail prairie dog colonies are found (McDonal and others 1981).

Whitetail prairie dogs provide habitat for the black-footed ferret. Prairie dogs are the primary food item for the black-footed ferrets and the prairie dog burrows are used by black-footed ferrets for shelter. Prairie dog burrows are also used by burrowing owls, a migratory bird of high federal interest, for shelter and nest sites.

Whooping cranes from the Gray's Lake *whooping crane foster parent program* annually migrate down the Green River corridor from north of the project area to Ouray, Utah. Bald eagles and peregrine falcons winter throughout the project area and Colorado squawfish inhabit the Green River below the confluence of the Yampa River and the Yampa River between the Green River and Craig, Colorado. Humpback chubs are found in the Green River below the confluence of the Yampa River and in the Yampa River between Cross Mountain Canyon and the Green River. In addition, winter bald eagle habitat could be found along the three Green River crossings at about MP 38, 106.5, and 143 (Maps A1-1 and A1-2).

DIRECT IMPACTS

Terrestrial Wildlife. Table 2-5 shows the acres and miles of wildlife habitats that would be disturbed by the Proposed Action. The Proposed Action would disturb 1,044 acres of pronghorn winter range and 480 acres of fawning habitat, 912 acres of mule deer winter range and 240 acres of fawning habitat, and 660 acres of elk winter range and 48 acres of calving habitat. These disturbances are not considered significant, based on the significance criteria, because they represent less than 1 percent of the total habitat and would be short-term. (Refer to the Proposed Action, Vegetation section, for the time needed to bring vegetative species back to preconstruction conditions.) Impacts to known fawning/calving habitat, sage grouse breeding/nesting habitats, and nesting raptors would be avoided by proper timing of construction activities (Appendix 3).

Secondary impacts caused by increased human population would not be significant because human population is not expected to increase by more than 2 percent during construction of the Proposed Action. Although

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-5
WILDLIFE HABITATS DISTURBED AND OCCUPIED BY THE PROPOSED ACTION

Habitat	Miles	Acres ¹
Pronghorn²		
winter, year-round, fawning	30	360
winter, year-round	57	684
summer, fawning	10	120
Mule Deer²		
winter, year-round, fawning	20	240
winter, year-round	56	672
Elk²		
winter, year-round, calving	4	48
winter, year-round	51	612
Raptor		
close proximity to known nests	33	N/A
Sage Grouse		
lek and nesting habitat	41	492
Prairie Dog		
colonies	29	348

¹Acreage figures based on 12 acres disturbed per linear mile.

²Big game habitat use categories (shown) may include more than one season or type of use, and are not additive. Further breakdowns are not available.

random camping by construction workers cannot be predicted, adverse impacts to wildlife are not likely to occur. Poaching, wanton killing, and harrassment of wildlife from the human population increases would not likely exceed 15 percent; therefore, these secondary impacts would be considered insignificant.

Sage grouse production would not be reduced because construction activities would not interfere with breeding and nesting sage grouse from March 1 through June 30, (Appendix 3, General Resource Measures).

Each raptor species has a different relative tolerance to disturbance during their nesting season and will abandon nests if that tolerance is exceeded. Raptors would abandon eggs and nestlings if construction activities occurred within the distance or period of this sensitivity. However, this is not expected to occur, as known nests would be avoided during the sensitive periods.

Aquatic Wildlife. Brown trout spawn in mid-October while rainbows spawn in mid-April making eggs and/or larval fish in the *redds* vulnerable to suffocation following these spawning times. A break or pipeline leak at these crossings could cause fish mortality in a plume-like pattern downstream. The probability of the CO₂ pipeline failing at any of the river crossings along the Proposed Action or Sand Wash Alternative would be 0.0001 accident per year or 1 accident in over 11,000 years (DOT 1983). Although construction is planned for the summer, losses of fish could occur from disturbance of redds or *larval fish* and suffocation.

In the event of a pipeline leak at one of the river crossings, a plume of water containing dissolved CO₂ would develop until the leak was detected and repaired. The distance the CO₂ plume is expected to extend cannot be reasonably predicted but would depend on factors such as size of the leak, water temperature, water turbulence, existence of dissolved salts, duration of the leak, *buffering,* and other reasons (Millis 1984).

The plume would spread and dilute by dispersion. Most of the gas would bubble to the surface. CO₂ is only slightly soluble in water. Under standard conditions, 1.08 milligrams per liter (mg/l) will go into solution and at 25°C, less than 0.5 mg/l will go into solution.

Fish are able to adjust to increases in CO₂ levels as high as 60 mg/l with little effect. Above this level, fish cannot get oxygen from the water and die. Some fish are able to detect and respond to slight CO₂ increases and may avoid CO₂ levels as low as 1.0 to 6.0 mg/l (Berr 1984).

Since 1949, the Green River at Jensen, Utah has ranged in temperature from 0°C to 30°C. During the 1982 water year, the water averaged 11°C, was predominantly alkaline, and its pH averaged 8.0. Flow ranged from 17,100 to 1,170 cubic feet per second (cfs) and averaged 4,382 cfs. The elevated temperature, the buffering action of the alkaline water, and the velocity of the Green River are all factors which would very quickly disperse, dilute, and neutralize any CO₂ leaking into the river. The most probable adverse effect of CO₂ releases in the streams is a lowering of the pH. This is not anticipated to be significant because the water is usually highly buffered by various bicarbonates and carbonates which would significantly lower the pH in the case of small leaks. The automatic shutoff valves would prevent a large buildup of CO₂ in the case of a pipeline rupture.

Threatened and Endangered Species. Implementation of the Proposed Action would disturb some threatened or endangered species including about 396 acres of whitetail prairie dog colonies which could furnish habitat for the endangered black-footed ferret (Table 2-5). Impacts to

PROPOSED ACTION—SOILS AND VEGETATION

the federally listed black-footed ferret by removal of prairie dog colonies could include direct mortality to any ferret underground in the path of construction machinery. Before any prairie dog habitat is disturbed by project facility construction, surveys would be required by the Fish and Wildlife Service to determine if ferrets are present. Populations of this animal are so low that any losses could have severe, adverse impacts. Short-term removal of prairie dog habitat should have no significant impacts to the ferret beyond possible direct mortality. Permanent removal of a small amount of prairie dog habitat due to construction of permanent facilities should not result in any significant impacts because of the total amount of prairie dog range available.

No adverse impacts to whooping cranes are anticipated since project facilities would not be near any known resting or staging areas. No adverse impacts to the peregrine falcon are anticipated because none of the project facilities would be near any known active eyries. Since construction is planned during the summer months, no adverse impacts to bald eagle habitat are anticipated.

Losses of the endangered Colorado squawfish and humpback chubs due to a CO₂ leak into the Green River are possible, but not probable. The Supervisory Control and Data Acquisition System (SCADA) terminals and block valves installed at the river crossings (MP 38 and 142.3) would protect against the release of large amounts of CO₂ in the case of a pipeline rupture. Natural stream buffering would be enough to reduce CO₂ toxicity from small undetected leaks.

CUMULATIVE IMPACTS

The cumulative impacts to wildlife caused by the Proposed Action pipeline and other related projects are not expected to be significant because construction would not disturb more than 1 percent of the available big game winter range and the population increase would not exceed 15 percent. No cumulative impacts would occur to fish from the river crossing of the CO₂ and phosphate pipelines because the timing of the crossings would be controlled to avoid spawning (Appendix 3, General Resource Measures).

SUMMARY OF IMPACTS

Construction and operation of the Proposed Action would not cause any significant, long-term impacts to wildlife. Losses to wildlife forage would be *short term.*

Impacts from a pipeline break or leak are not expected to have significant impacts to fish because of the automatic shut-off valves that will be installed. The

shut-off valves would protect fish from pipeline ruptures. Natural buffering of the water would protect fish from CO₂ mortality in the event of smaller leaks.

Soils and Vegetation

IMPACT SIGNIFICANCE CRITERIA

Impacts to soils and vegetation were considered significant if:

- the loss of soil and reduction in soil productivity and stability from land disturbance prevented successful restoration and recovery to near pre-construction conditions;
- following construction, more than 5 years was required to reestablish a ground cover to pre-construction densities;
- poisonous and/or *noxious plants* invaded and occupied more than 10 percent of a specific vegetation type where none previously existed;
- any sensitive plant species (candidate and state rare species and rare plant associations) were affected.

AFFECTED ENVIRONMENT

Two major land resource areas (MLRAs) comprise the project area (SCS 1981). The Central Deseritic Basin Mountains and Plateau area, MLRA 34, is located in the southern and northern parts of the area of influence. MLRA 34 has an average annual precipitation of 6 to 12 inches and an average frost-free season of 80 to 125 days. The Uinta Mountain area, MLRA 47, is located in the central part of the project area. MLRA 47 has an average annual precipitation of 12 to 20 inches and an average frost-free season of 60 to 110 days.

Elevations range from 6,470 feet at the proposed La Barge gas plant to 7,940 feet at Red Creek Basin Escarpment, 7,090 feet at Rye Grass Draw, 4,800 feet at the Green River crossing near Jensen, and 5,315 feet at the Rangely Unit oil field.

Soils. The project area includes a wide variety and complex combination of soils caused by variations in parent material, topography, climate, and vegetation. The following generalized groups of soils were combined to evaluate potential impacts and determine effective erosion control measures, reclamation, and revegetation potential in the area.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

- *Soils of the terraces and floodplains.* This group of soils occurs in two precipitation zones—areas with less than 9 inches of annual precipitation and areas with 10 to 16 inches.
- *Soils of the rolling uplands, high terraces, *alluvial fans, *and plateaus.* This group of soils occurs in two precipitation zones—areas with less than 9 inches of annual precipitation and areas with 10 to 16 inches.
- *Shallow, steep sloping soils and rock outcrop.* This soil group occurs in two precipitation zones—areas with less than 9 inches of annual precipitation and areas with 10 to 16 inches.
- *Moderately dark colored soils of the plateaus and sideslopes.* This group of soils has an annual precipitation ranging from 12 to 16 inches.
- *Soils of the mountains and high plateaus.* This group of soils has an annual precipitation ranging from 12 to 20 inches.
- *Soils of the mountain valleys and drainageways.* This group of soils has an annual precipitation ranging from 10 to 16 inches.
- *Strongly saline and alkaline soils on terraces, fans, and sideslopes.* This group of soils occurs in two precipitation zones—areas with 9 inches of annual precipitation or less and areas with 10 to 16 inches.

(See Appendix 7 for a brief description of these groups.)

Reclamation and erosion control would be difficult on many soils in the area, especially in areas with less than 9 inches of annual precipitation and on the steeper sloping areas (15 percent and more) with shallow soils. Unfavorable soil properties, including rock fragments, thin surface layers, moderate to strong alkalinity and salinity, and shallow depths, are common and would present problems for erosion control and revegetation. (Refer to Appendix 7 for a discussion of unfavorable soil properties.) The most favorable areas for revegetation are the floodplain and terrace soils and the less-sloping plateau soils in zones with more than 9 inches of annual precipitation.

Construction activities, mainly excavation, would be difficult in areas of shallow soils underlain by hard bedrock (most commonly on crest slope and ridge positions) and areas of rock outcrops. Because these areas

lack unconsolidated soil material, additional fill materials from outside sources would be required to provide adequate bedding material for pipeline construction.

The location and extent of the larger areas of unfavorable soils and terrain most susceptible to impacts from project activities are identified by project component in Table 2-6.

Vegetation. Native vegetation in the project area is characteristic of the arid and semi-arid regions of the United States (Cronquist and others 1972). Vegetation follows a zonal pattern that is determined by precipitation zones at specific elevations. The 4,800 to 7,000-foot elevations, which have an annual precipitation of 7 to 12 inches, support greasewood, saltbush, and sagebrush-grass vegetation types. Juniper and pinyon-juniper types occur at 7,000 to 8,000-foot elevations with annual precipitation generally above 12 inches. Pinyon-juniper types grade into the sagebrush type at lower elevations. Pinyon-juniper types also grade into the forest type on sideslopes with north exposures on the higher ridges, or at the upper extremes, occupied by patches of mountain shrub vegetation (BLM 1977a).

The Proposed Action would affect six major vegetation types: sagebrush grass, pinyon-juniper, greasewood, wet meadow-riparian, saltbush-shadscale, and mountain shrub. See Appendix 7 for a brief description of vegetation types.

Sensitive Plants. The *Astragalus hamiltonii* is identified as sensitive and known to occur between MP 149.9 and MP 150.1. The following sensitive plants are known to occur within the Raven Ridge potential Area of Critical Environmental Concern (ACEC) that lies adjacent to the proposed pipeline between MP 165.5 and MP 175.0 (Map 1-2): *Penstemon grahamii*, *Astragalus lutosus*, *Chamaechaenactis scaposa*, *Eriogonum ephedroides*, *Cryptantha rollinsi*, *Astragalus detritalis*, *Bolophyta ligulata*, and *Physelia condensata*.

Key Issue Areas. Construction and operation of the Proposed Action would affect the following key issue areas:

- *Red Creek Basin Escarpment.* This area is located between MP 83.8 and 85.7 (Map A1-1) near the northern (upper) edge of the Red Creek Watershed *Area of Critical Environmental Concern (ACEC)* boundary. The area contains (1) a resistant sandstone ledge about 8 to 12 feet thick near the upper edge; (2)

PROPOSED ACTION—SOILS AND VEGETATION

TABLE 2-6
AREAS MOST SUSCEPTIBLE TO SOIL AND VEGETATION IMPACTS FROM
THE PROPOSED ACTION

Project Component	Location by Milepost	Extent in Miles	Less than 9 inches Annual Precipitation	Slopes (15% +)	Unfavorable Soils Properties ¹	Other
CO ₂ Pipeline	0.7-7.2	7.2	X			
	7.2-7.8	0.6	X	X	X	
	7.8-11.1	3.3	X			
	11.1-11.6	0.5	X	X	X	
	11.6-12.3	0.7	X			
	12.3-12.8	0.5	X	X	X	
	12.8-15.9	3.1	X			
	15.9-16.4	0.5	X	X	X	
	16.4-17.1	0.7	X			
	17.1-17.3	0.2	X	X	X	
	17.3-35.7	18.4	X			
	35.7-37.9	2.2	X	X	X	
	37.9-38.0	0.1	X			
	38.0-38.2	0.2				Green River Crossing
	38.2-38.5	0.3	X			
	38.5-38.8	0.3	X	X	X	
	38.8-39.4	0.6	X			
	39.4-39.6	0.2	X	X	X	
	39.6-39.7	0.1	X			
	39.7-40.4	0.7	X	X	X	
	40.4-40.9	0.5	X			
	40.9-41.2	0.3	X	X	X	
	41.2-47.3	6.1	X			
	47.3-49.5	2.2	X	X	X	High Erosion Hazard
	49.5-50.5	1.0	X			
	50.5-50.8	0.3	X	X	X	
	50.8-64.4	13.6	X			
	73.6-76.8	0.5		X		
	78.4-79.8	1.4		X	X	
	80.2-80.7	0.5		X	X	
	81.1-81.9	0.8		X		
	83.9-85.7	1.8		X	X	Red Creek Basin Escarpment (Map 1-2)
	85.5-89.8	0.3		X		
	92.8-93.2	0.4			X	Richards Gap (stream course)
	99.6-101.9	2.3		X	X	Jesse Ewing Canyon (Map 1-2)
	106.5-106.7	0.2				Green River Crossing
	109.9-111.4	1.5		X		Rye Grass Draw (Map 1-2)
	128.5-140.8	12.0	X			
	140.5-140.8	0.3	X	X		
	140.8-143.2	2.4	X			
	143.2-143.4	0.2				Green River Crossing
	143.4-145.3	1.9	X			
	145.3-145.6	0.3	X	X	X	
	145.6-150.0	4.4	X			
	170.2-170.7	0.5		X	X	
	171.5-171.7	0.2		X	X	
TOTAL		96.3 (1,114 acres)				

Note: Table prepared from soils-terrain analysis and orthophotograph interpretations. MP locations are approximate, based on general, preliminary pipeline right-of-way information.

¹Unfavorable soil property parameters:

- shallow over bedrock less than 20 inches
- underlain by hard bedrock
- sand, loamy sand and clay textured surface and subsoil layers
- containing more than 35 percent coarse fragments by volume, exceeding sizes of 3 inches in diameter
- permeability less than 0.6 inch per hour
- water table less than 72 inches
- soil reaction with pH value greater than 8.5, salinity more than 16 millimhos in the upper 40 inches
- occupying slopes steeper than 15 percent

These soils are most susceptible to impacts and have low reclamation potential.

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very steep, sparsely vegetated sideslopes (30 to 65 percent) and badlands consisting mainly of interbedded sandstone and shale exposures with small inclusions of shallow, loamy, and *clayey soils* underlain with soft bedrock; and (3) strongly sloping to steep sideslopes (15 to 30 percent) vegetated with pinyon-juniper and a low density understory of grasses and forbs, with shallow to moderately deep and deep, loamy soils forming from sandstone and shale.

The area has a *dendritic drainage pattern* with several intermittent stream tributaries leading to Red Creek. The badlands and steep sideslope exposures of sedimentary rock have very small amounts of unconsolidated materials and are subject to geological or natural erosion. Landslides have occurred in the area; however, no active landslides are known to occur in the immediate pipeline alignment area.

- *Jesse Ewing Canyon.* This area is located between MP 99.8 and 102 (Map A1-2). *Jesse Ewing Canyon* is narrow and contains an intermittent drainageway with slopes ranging from 9 to 28 percent and bordered by very steep mountain sideslopes (30 to 65 percent). Soils within the drainageway are deep and loamy, containing 35 to 60 percent rock fragments varying in size from 3 inches to 2 feet in diameter. The steep canyon sideslopes consist of rock outcrops and shallow, rocky, sandy loam soils underlain by hard bedrock. Springs are located on the east-facing mountain sideslope near the central part of the Canyon. The area currently contains a county road and the Mid-America Pipeline Company (MAPCO) pipeline.
- *Rye Grass Draw.* This area is located between MP 109.9 and 111.4 (Map A1-2). It consists of a concave, mountain drainageway with slopes ranging from 9 to 28 percent. Portions of the Draw with steeper slopes (15 to 28 percent) are usually narrow and bordered by steep mountain sideslopes (30 to 60 percent slopes) with shallow, rocky soils underlain by hard bedrock. Soils within the concave drainageway and toe slopes of the steep bordering sideslopes are usually deep and loamy and contain more than 35 percent rock fragments.

DIRECT IMPACTS

Construction and installation of the pipeline would disturb soils and vegetation. Construction activities would result in (1) vegetation removal; (2) reduced

vegetation growth from sidecasting of material; (3) *top-soil* disturbance and removal; (4) soil compaction; (5) alteration of the soil profile along the excavated trench area of the pipelines, sidehill cuts in steep sloping areas; and (6) loss of soil and rock from sidecasting on steep sidehill cuts, which would affect surface water runoff, wind and water erosion, soil stability, and plant growth. Accelerated wind and water erosion would occur when land has been disturbed and would continue until erosion control measures are implemented (within 1 year). Also access roads required for project maintenance could be used for *off-road vehicle (ORV)* activities, thus creating problems in controlling and minimizing off-road land disturbance. Vehicles could cause ruts in dirt access roads during wet soil conditions, and runoff along these ruts could create gully erosion.

Refer to Appendix 7 for a discussion of the erosion control and reclamation program analysis. The erosion control and reclamation program and the concurrence by Chevron to comply with the *Erosion Control, Revegetation, and Restoration Guidelines for Use of Federal Lands*, would provide an effective program that would ensure successful erosion control and reclamation of all land disturbance.

Final pipeline alignment would avoid, where possible, the smaller, localized areas of highly erodible slopes and unstable slopes. This would reduce the potential for accelerated erosion and other impacts.

Soils. The Proposed Action would disturb 1,992 acres of land, all of which would be reclaimed. The pipeline would disturb 1,114 acres of sensitive soil areas. These sensitive soil areas contain less favorable soil and climatic conditions and are more susceptible to erosion hazards and have lower revegetation potential. See Table 2-6 for location and extent of areas most susceptible to soil impacts.

With effective use of applicable erosion control and reclamation procedures as outlined in Appendix 3, the loss of soil and reduction of soil productivity and stability would be minimal and would allow for successful restoration to near preconstruction conditions. Therefore, impacts to soils would be generally insignificant. Some unquantifiable soil loss resulting from accelerated wind and water erosion would occur until erosion control measures are implemented (1 year). A few, small (less than 150 feet long), unquantifiable areas (mainly abrupt, steep slopes and localized areas with soils containing very unfavorable physical and chemical properties) would be subject to accelerated erosion and require intensive and continuing follow-up erosion control measures. However, soil impacts would be significant if applicable erosion control measures were not properly implemented due to lack of compliance with approved

PROPOSED ACTION—SOILS AND VEGETATION

plans and stipulations, or if adverse weather conditions (mainly heavy rainstorms) occurred during construction before erosion control measures could be implemented.

Vegetation. The estimated acreages of each vegetation type that would be disturbed by the proposed pipeline and occupied by associated facilities are shown on Table 2-7. *Understory* vegetation (grasses and forbs) is expected to return to near-preconstruction densities within 5 years following construction. *Overstory* vegetation (shrubs and trees) would take longer to become established to near preconstruction conditions:

Pinyon-Juniper	50 to 75 years
Sagebrush types	10 to 25 years
Saltbush and greasewood	20 to 30 years
Mountain shrub types	20 to 40 years
Riparian vegetation (trees, shrubs, and bushes)	10 to 25 years

The significance of impacts and the acreage that would be affected would depend on how well the proposed reclamation program and measures outlined in Appendix 3 are used. Areas with lower reclamation and revegetation potential that would be more susceptible to impacts are identified in Table 2-6.

Significant impacts to vegetation could occur in the low precipitation zone (less than 9 inches annually). In this zone, understory could require more than 5 years to successfully revegetate, and halogeton and other invader plants could exceed 10 percent of the plant cover. However, grass establishment would still be expected within 5 years using more intensive and effective erosion control and revegetation measures.

Sensitive Plants. The CO₂ pipeline would be next to the MAPCO pipeline and US Highway 40 from MP 149.9 to 150.1 and would avoid disturbance of the sensitive plant species *Astragalus hamiltonii*. The pipeline from MP 165.5 to 177.0 would be next to the MAPCO pipeline and would avoid disturbance to the sensitive plants associated with the Raven Ridge potential ACEC.

Key Issue Areas.

- *Red Creek Basin Escarpment* (Map A1-1). Pipeline construction through this area would be done simultaneously with the Chevron phosphate slurry pipeline, causing: (1) sidescasting of mainly consolidated soft bedrock (interbedded sandstone and shale) materials where the pipeline crossed the badlands and steep sideslopes; (2) potential unstable soil conditions requiring special construction techniques in portions where the alignment crossed narrow concave alluvial/colluvial fill areas; (3) minimal soil loss

TABLE 2-7
ACRES OF VEGETATION TYPES DISTURBED AND OCCUPIED BY THE PROPOSED ACTION

Vegetation Types	Proposed Action	Interrelated Projects	Cumulative Total
Sagebrush-Grass	1,252	879 (640)	2,131 (640)
Pinyon-Juniper	164	58	222
Greasewood	58	3 (3)	64 (3)
Wet Meadow-Riparian	25	13	38
Saltbush-Shadscale	432	26	455
Mountain Shrub	50	6	56
Cropland (irrigated)	11	0	11
TOTAL	1,992	985 (643)	2,980 (643)

Source: Diamond Mountain URA (BLM 1977c); Browns Park URA (BLM 1977a); Ashley Creek URA (BLM 1979e); Salt Wells Oil and Gas EA (BLM 1981c); White River Grazing EIS (BLM 1980a); Salt Wells-Pilot Butte Grazing EA (BLM 1983d); and interpretations of orthophotographs.

Note: Figures enclosed by parentheses are acreages that would be removed (occupied) for the life of project. All disturbed acreage would be reclaimed. Acreage occupied would be reclaimed when the project was abandoned.

from sidescasting due to the limited soil development along the steep sloping badland and exposure areas (in smoother sloping areas where deeper soils are forming, sidescasting materials could be stockpiled and replaced in the right-of-way); (4) accelerated geologic or natural erosion, especially during adverse weather conditions; and (5) increased sediment yield in the alignment area from construction and operation activities; this increase would be minimal because of the limited watershed area (locations in the upper portion of the watershed), shape and number of tributary drainages, and the nature of the cut materials (mainly consolidated rock materials).

- *Jesse Ewing Canyon* (Map A1-2). The Proposed Action through *Jesse Ewing Canyon* would be constructed simultaneously with the

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Chevron phosphate slurry pipeline and the realignment of the county road. Additional impacts caused by construction of the CO₂ pipeline would be insignificant. Construction of the phosphate slurry pipeline and county road would require extensive sidehill cuts in the steep mountain sideslopes to accommodate the grade requirement necessary for these facilities. This would cause extensive sidecasting and reclamation would be difficult as identified in the Chevron Phosphate Project EIS (BLM 1983c).

- *Rye Grass Draw* (Map A1-2). Construction of the CO₂ pipeline through Rye Grass Draw is not expected to contribute any significant additional impacts to soils and vegetation because the CO₂ pipeline: (1) would be constructed simultaneously with the Chevron Phosphate Project, and (2) could parallel the MAPCO pipeline or be constructed within the phosphate pipeline alignment.

CUMULATIVE IMPACTS

Cumulatively, the construction and operation of the Proposed Action and the phosphate slurry pipeline would disturb 2,980 acres of land. Refer to Table 2-7 for acres of vegetation types disturbed and removed.

Cumulative impacts to soils and vegetation would be similar to those identified for the Proposed Action alone. Simultaneous construction with the phosphate slurry pipeline (MP 80 to 120) would reduce land disturbance. Similar to the Proposed Action, some vegetation impacts could occur in the low precipitation zone (less than 9 inches annually) and in areas with unfavorable soil and terrain. Areas with lower restoration and revegetation potential would be more susceptible to impacts (Table 2-6).

SUMMARY OF IMPACTS

With effective use of the applicable erosion control and reclamation procedures outlined in Appendix 3, the loss of soil and reduction of soil productivity and stability would be minimal, thus allowing for successful restoration. Therefore, impacts to soils would be insignificant. Some unquantifiable soil loss resulting from accelerated wind and water erosion would occur until erosion control measures were implemented.

Impacts to vegetation would generally be insignificant. Understory vegetation is expected to return to near preconstruction densities within 5 years after construction using the erosion control, reclamation, and revegetation program outlined in Appendix 3. Significant impacts could occur in low precipitation zones (less than

9 inches annually) if understory vegetation required more than 5 years to adequately reestablish or if halogeton and other invader plants exceeded 10 percent of the plant cover. However, grasses could still be reestablished within 5 years with more intensive use of effective erosion control and revegetation measures.

The Proposed Action would not significantly affect any sensitive plants.

Water Resources

SIGNIFICANCE CRITERIA

Impacts to water resources were considered significant if:

- annual sediment loads in streams increased more than 1 percent;
- the characteristics of floodplains were changed so that flood flows were impeded.

AFFECTED ENVIRONMENT

The proposed pipeline would traverse parts of the Green River Basin and would cross the river three times. The river, which has an annual average discharge of 4,563,000 *acre-feet* at Green River, Utah, is regulated by two reservoirs: Fontenelle, upstream from all crossings, and Flaming Gorge, upstream from the lower two crossings. Sediment carried by the river at Jensen ranges from 10 to 2,500,000 tons per day and totalled 10,281,496 tons during the 1980 water year (USGS 1981).

The pipeline would also traverse the Red Creek drainage. The route would enter the Red Creek drainage at MP 84 and, following an existing pipeline, descend the escarpment, traverse the toe slopes, and cross Red Creek at Richards Gap (MP 93.5). At about MP 95, the route would enter Clay Basin Creek drainage, cross the creek at MP 98, and leave the drainage at MP 99.5. It would then descend through rock-bound *Jesse Ewing Canyon* to the floodplain of the Green River.

DIRECT IMPACTS

Construction and operation of the pipeline would cause short-term increases in erosion along steep slopes, sedimentation during construction across streams, and

PROPOSED ACTION—WATER RESOURCES

stream sedimentation from an improbable rupture of the pipeline beneath a stream during operation.

Construction across intermittent streams and drainages would not increase sediment because crossings would be made during the dry period of the year. Crossings of small perennial streams would result in short-term, localized suspended sediment a short distance downstream, which is less than the sediment produced by summer thunderstorms.

Determining impacts at river crossings would require estimates based on a number of factors including the particle size of stream-bottom material at the site and the flow rate at the time of crossing. Most of these data do not exist. An estimate made for the Green River crossing at Browns Park reported by Chevron Chemical Company (1982b) shows suspended sediment concentrations downstream to be 1,200 mg/l, 140 mg/l, and 3 mg/l, at 50, 100, and 200 feet, respectively. These elevated levels of suspended sediment would occur only during actual in-water construction (portions of 3 to 4 days). Because Chevron's estimate used a worst-case condition (smaller particle size than probably would be encountered), quantities of sediment actually produced would be less, however even if these concentrations occurred they would represent a short-term, insignificant impact. No structures to impede floodflows would be built in floodplains.

Red Creek Basin Escarpment. Additional sediment to the Green River from Red Creek would come primarily from the Red Creek Basin Escarpment and other areas in the upper part of the watershed. The amount of erosion on the Red Creek Basin Escarpment depends on the vegetation and soil materials present and the energy factors of slope and rainfall characteristics. The Escarpment does not have typical characteristics: the materials that would be excavated are unconsolidated rock debris rather than soil, and rainfall events are not well documented. At MP 84, the pipeline would descend about 1,700 feet down the steepest part of the Escarpment. This part consists of resistant sandstone layers and interbedded siltstone and shale layers where soil is thin or nonexistent. The working width would be 75 feet; thus, only about 3 acres would be disturbed. Covering the *backfill* with excavated rock would protect the area from erosion. The route would then descend less steep slopes along the side of the Basin before reaching the existing road. The pipeline would then follow the road to Richards Gap where it would cross Red Creek.

The portion of the Red Creek watershed that could contribute sediment is the steeper part consisting of 9 acres that would be disturbed just below the *Red Creek Basin*

Escarpment. A 75-foot working width is assumed, including the upperslope and overcast downslope areas.

The Proposed Action would be built simultaneously with the Chevron Chemical Company phosphate slurry pipeline. Since the slurry pipeline requires two check dams to be built on the major drainages coming from the Escarpment, the impacts previously identified would be insignificant.

During construction, a 1-inch layer of this sediment/soil could erode or contribute sediment by heavy rain. The resultant volume would be 32,670 cubic feet (or 0.75 acre-feet), which at 80 pounds per cubic foot would equal 1,300 tons. This quantity would be less than 0.015 percent of the average annual sediment load of the Green River. Little of this sediment would reach the Green River from Red Creek. (Appendix 3, State of Wyoming, Office of Industrial Siting Administration Permit Conditions to Mitigate the Environmental and Socioeconomic Impacts of the Chevron Phosphate Project.) Much of the erodible material is coarse and would be retained in the sediment ponds required for the Chevron Phosphate Project and could not reach Red Creek. Only the finest materials could eventually reach the Creek and the River. The short-term sediment contribution to the Green River would be much less than 1 percent of Red Creek's existing contribution which does not meet the significance criteria of a long term increase in sediment load of 1 percent. Therefore the impact would be insignificant.

Because of larger grain sizes in *Jesse Ewing Canyon*, no measurable sediment from this source would reach the Green River.

Floodplains. Impacts to floodplains from construction would be short term—during construction and for 1 year thereafter. Construction would contribute relatively small amounts of sediment to the Green River. The pipeline would be buried in floodplains. Since pipelines must be buried below maximum scour depth, construction and operation of the pipeline would not affect flood stage.

CUMULATIVE IMPACTS

Although the Chevron Phosphate pipeline and the CO₂ pipeline would be built within a few days of each other the impacts on water quality would be insignificant because the additional sediment load created during the first crossing would end before the second crossing occurred. Even if the two pipeline crossings were carried out on the same day, the increased sediment load would still be short term and therefore would not meet the significance criteria of long term increases of 1 percent.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

SUMMARY OF IMPACTS

The Proposed Action would not significantly affect the flow or quality of water resources because (1) no water would be consumed, (2) the potential sediment contribution would be minimized or eliminated by required construction practices, and (3) no structures on floodplains would impede flow. No additional cumulative effects are anticipated.

Agriculture

IMPACT SIGNIFICANCE CRITERIA

Impacts to livestock grazing were considered significant if:

- the amount of forage lost reduced livestock stocking rates by 5 percent or more in each affected pasture or allotment; or
- pipeline construction allowed an open trench or other obstructions (without crossings), preventing livestock access to water for periods of more than 1 day, or disrupted grazing patterns for periods longer than 2 weeks.

Impacts to cropland were considered significant if:

- the productivity of any of the cropland were diminished within the project area;
- more than 5 acres of cropland were irreversibly converted to other uses; or
- cropland outside of the project area was affected to the extent that more than 5 percent of the total cropland in the area was irreversibly converted to other uses because of project development.

AFFECTED ENVIRONMENT

The Proposed Action would cross state and federal lands authorized for livestock grazing. The BLM has established grazing allotments that designate parcels of land where grazing privileges are authorized. These allotments also include lands administered by the State of Utah and the State of Wyoming and land privately owned. The Rock Springs allotment in Wyoming contains alternating sections of private and BLM-administered land, all of which are managed by the

Rock Springs District Office. Grazing allotments that would be affected by the Proposed Action are listed in Table 2-8. Ranching operations include cow-calf or cow-calf-yearling operations and sheep grazing.

Grazing capacities vary due to vegetative types (range sites), landform, slope, and range condition. Grazing capacity ranges from 6 to 25 acres per *animal unit month (AUM).* Areas with lower carrying capacities occur in the lowlands and steep sideslopes located in the lower precipitation zone (less than 9 inches annually). These areas support a cover of mainly saltbush, greasewood, and sagebrush vegetation with an average of 15 to 25 acres per AUM. Middle elevations with 9 to 12 inches of annual precipitation that support sagebrush, pinyon-juniper, and some mountain brush areas average 10 to 15 acres per AUM. Higher elevations and areas with greater average annual precipitation support more grasses, which results in a higher carrying capacity averaging 6 to 12 acres per AUM.

Farming (Cropland). The proposed CO₂ pipeline would cross 0.9 mile of irrigated cropland on the terrace of the Green River (MP 142.4 to 143.3). Alfalfa hay, small grains (barley and oats), corn for silage, and meadow hay are crops grown in this area. Some land is also used for irrigated pasture. The principal crop is alfalfa hay. Approximately 50 percent of the irrigated cropland in this area is identified as prime agricultural land (SCS 1970). No cropland would be affected by any of the surface facilities.

No cropland occurs within the Rock Springs or Vernal areas where increased population from project activities could cause land use conversion for homesite and related urban development.

DIRECT IMPACTS

Livestock Grazing. The loss of forage caused by pipeline construction would be less than 1 percent for the area, which is less than the 5 percent significance criteria and, therefore, insignificant. Table 2-8 identifies the potential loss of AUMs by allotment, number of operators, and the percentage of each allotment affected.

The disturbance associated with construction of the pipeline would cause a short-term loss of forage (2 to 5 years) on approximately 1,992 acres along a narrow, elongated area. The pipeline would affect an average of 9 acres of land per mile for a period of 2 to 5 years; this acreage represents about 1 AUM per mile on the higher producing areas and $\frac{1}{3}$ AUM per mile on other lands. Approximately 136 AUMs of forage would be lost for 2 to 5 years due to construction activities, which would be considered an insignificant impact.

PROPOSED ACTION—AGRICULTURE

TABLE 2-8
GRAZING ALLOTMENTS DISTURBED AND OCCUPIED BY THE
PROPOSED ACTION

		CURRENT STATUS				POTENTIAL GRAZING LOSSES (AUMS)				
State	Allotment Name (Number)	Number of Operations	Livestock Class ¹	Season of Use ²	Total and Active Preference ³	Proposed Action	Interrelated Projects	Cumulative		
								Total	Percent of Allotment	
Wyoming	Granger	8	C,S	Y	20,603 (16,587)	5	32	37	0.1	Large Allotment with Alternating Sections of Private and BLM-administered Land
	Rock Springs (3018)		C,S,H	Y	213,106 (107,227)	49	152	207	0.1	
	Mellor Mountain (4027)		C,S	S-Su-F	9,162 (6,101)	6	2	8	0.1	
	Salt Wells (4009)		C,H	S-Su	4,568 (2,618)	3	2	5	0.2	
	Red Creek (4008)		C	S-Su	7,261 (4,592)	6	4	10	0.2	
Utah	Clay Basin	2	C	S-Su-F	(2,905)	3	2	5	0.1	No Grazing Allowed
	Willow Creek	3	C	S-Su	(1,234)	1	1	2	0.1	
	Bridgeport	1	C	S	(139)	4	3	7	4.0	
	Taylor Flat	*	C,S	S	(1,000)	1	0	1	0.1	
	Watson	*	C	S	*	1	1	2	0.1	
	Rye Grass	0	O	O	(0)	5	3	8	NA	
	Crouse Reservoir	1	C	S-Su-F	290	3	2	5	1.0	
	Mail Draw	1	C	S-Su-F	(85)	1	1	2	2.3	
	Gadson	1	C	S-F	(60)	1	1	2	3.0	
	Diamond Spring (4837)	1	S	S-Su-F	120	1	1	2	0.8	
	Diamond Gulch	1	S	S-Su-F	(760)	1	0	1	0.1	
	Davis Draw (4818)	1	S	S-Su-F	(282)	1	0	1	0.3	
	Bowery Spring (4837)	1	S	S-F	(135)	1	0	1	0.7	
	Shiner (4869)	1	S,C	W	(3,421)	2	0	2	0.05	
	McFarley Flat (4863)	2	C	S-F	(360)	7	0	7	1.9	
	Park (4867)	2	C	S-F	(98)	2	0	2	2.0	
	Jensen (5836)	4	C,S	F-W-S	(681)	4	0	4	0.6	
	Cocklebur (5833)	1	S	F-W-S	(1,729)	3	0	3	0.2	
	Powder Wash (5837)	1	S	F-W-S	(2,100)	6	0	6	0.3	
	Snake John (5860)	1	S	F-W-S	(1,164)	6	0	6	0.5	
Colorado	Artesia (6308)		S	W-S	5,208 (3,712)	9	0	9	0.2	

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-8 (Concluded)
GRAZING ALLOTMENTS DISTURBED AND OCCUPIED BY THE
PROPOSED ACTION

State	CURRENT STATUS				POTENTIAL GRAZING LOSSES (AUMS)				
	Allotment Name (Number)	Number of Operations	Livestock Class ¹	Season of Use ²	Total and Active Preference ³	Proposed Action	Interrelated Projects	Cumulative Total	Percent of Allotment
Coal Oil (6313)	1	S	W	250 (164)	4	0	4	2.3	Oil Field Area
TOTAL 27 Allotments	NA	NA	NA	NA	136	217	343	NA	

Source: Livestock grazing and forage carrying capacity information presented in this table was gathered from the Salt Wells-Pilot Butte Grazing Draft EIS (BLM 1983d); Draft Three Corners Grazing Management EIS (BLM 1979a); White River Resource Area Grazing Management Draft EIS (BLM 1980a); Big Sandy Salt Wells Oil and Gas EA (BLM 1981c); Ashley Creek URA (1979); Little Snake URA (1980d) and communication with range conservationists at the Vernal, Craig, and Meeker BLM offices.

¹Class of Livestock: C = Cattle, S = Sheep, and H = Horses.

²Season of Use: S = Spring, Su = Summer, F = Fall, W = Winter, and Y = Yearlong.

³Active Preference AUM figure is included in parentheses.

*No specific livestock operators on these allotments. Livestock use is on a temporary and nonrenewable basis. Both allotments together generally have 1000 AUMs, allowed annually.

Halogeton and other invader plants could occur in areas with less than 9 inches of annual precipitation. If the densities of these invader plants exceeded 10 percent, impacts to grazing would be significant.

In addition to direct loss of livestock forage and the invasion of unfavorable plants, other secondary impacts caused by pipeline construction could occur during the grazing season: (1) pipeline trench and construction activities could disrupt daily livestock access to watering facilities for longer than 1 day; (2) pipeline trench could be left open without crossings for longer than 14 days causing a disruption in grazing patterns; and (3) gates could be left open or temporary gap fences left unsecured resulting in livestock grazing control problems.

Reclamation and revegetation of land disturbance is expected to be successful and would provide forage production for grazing. Successful reclamation is expected based on three assumptions: (1) implementation of the erosion control and reclamation programs outlined by Chevron; (2) compliance with site-specific erosion control and reclamation plans approved by federal and state authorizing agencies and private landowners; and (3) compliance with requirements and stipulations of right-of-way grants for federal and state lands. (State lands require that weed control be practiced as part of a right-of-way permit.)

Farming (Cropland). Pipeline construction would disturb 11 acres of irrigated cropland (along the terrace of the Green River in Browns Park) for one growing season. Impacts to cropland from pipeline construction would be insignificant and short term (1 year) because soil productivity would not be diminished with implementation of the erosion control and reclamation procedures (Appendix 3). No cropland would be removed from production by any of the proposed surface facilities.

Population increases and associated support facilities from project activities would not cause any impacts to farming. No cropland would be converted to other uses in the Rock Springs or Vernal areas.

CUMULATIVE IMPACTS

Livestock Grazing. Cumulatively, the Proposed Action plus the interrelated projects would affect 14 allotments. The cumulative total would cause a loss of 276 AUMs of forage per year for a period of 2 to 5 years and 67 AUMs per year for the life of the interrelated projects (Table 2-8). This would be considered an insignificant impact to individual livestock operations and to the industry in general because the forage loss would be less than 1 percent, which is less than the 5 percent forage reduction significance criteria for any allotment.

PROPOSED ACTION—VISUAL RESOURCES

Farming (Cropland). The Proposed Action combined with the Chevron Phosphate Project would not cause any significant cumulative impacts to cropland. No additional cropland would be disturbed by the interrelated project.

SUMMARY OF IMPACTS

No significant long-term impacts would occur to agriculture from construction and operation of the CO₂ pipeline. Soil productivity would not be reduced and revegetation is expected to be successful by the effective use of applicable erosion control, reclamation, and revegetation measures. However, some secondary, short-term impacts caused by pipeline construction could occur during the grazing season:

- Livestock access to watering facilities could be disrupted for longer than 1 day;
- grazing patterns could be disrupted from the trench being left open for longer than 14 days; and
- livestock grazing control problems could occur from gates or temporary gap fences being left unsecured.

No significant long-term conversion of grazing or cropland areas to other uses would occur from project activities.

Visual Resources

IMPACT SIGNIFICANCE CRITERIA

Impacts were considered significant if:

- modifications in the landform and vegetation or the addition of a structure did not meet the minimum standards of the BLM *Visual Resource Management (VRM) classes* for the area where the project component would be located.

AFFECTED ENVIRONMENT

The Proposed Action would occur within three *physiographic provinces* containing a characteristic set of landscape features including landform and vegetation (Fenneman 1931). These features are used to determine existing visual values and to determine how changes caused by the Proposed Action would affect these visual values.

The northern portion of the Proposed Action would occur within the Wyoming Basin physiographic province, which is characterized by upland plains dissected by *dendritic drainage patterns* creating moderate to steep sideslopes. The vegetation is generally a sagebrush/grass type with pinyon-juniper types scattered throughout. Cultural modifications are few, except for a few roads and an interstate highway, ranching facilities, occasional utility lines, and communities such as Green River and Rock Springs, Wyoming.

The central portion of the Proposed Action would traverse the Middle Rocky Mountains physiographic province. This area is characterized by steep, rugged mountains, crossed by the Green River to the north and covered with sagebrush/grass types in the lowlands and open areas, a mixture of mountain shrub/aspen/conifer on the higher elevations, and pinyon-juniper on the remainder of the area. Natural features have been infrequently altered, but changes include highways, primitive roads, occasional residences, historical structures, and mineral development.

The extreme southern portion of the route would enter the Colorado Plateaus physiographic province. This portion of the province is characterized by flat to gently rolling landforms with occasional, steeper ridges. The Green River and tributaries of the White River flow through the province which is covered with sagebrush/grass types, pinyon-juniper, and occasional croplands. Cultural modifications include highways, rural homes, and utilities, agricultural and rangeland improvements, and mineral development.

The established VRM classes for the affected areas relate to the physical characteristics of the physiographic provinces previously described and viewing conditions such as visual sensitivity and viewing distance. The Proposed Action would cross four VRM classes. Table 2-9 summarizes existing affected acres for each class by milepost and facility location. The Proposed Action would cross 20 miles of VRM Class II areas, which are generally located along the Green River and in the Red Creek Basin Escarpment. Class II areas generally correspond to the most visually sensitive and highly scenic portions of the project area. VRM Class III areas are generally associated with major and secondary highways, near communities, and the Browns Park area; the route would cross 78 miles of Class III areas. The remaining 72 miles of the route would cross primarily VRM Class IV areas, which are areas generally unseen by the public or the landscape features are less diverse. The Proposed Action would also cross 5 miles of VRM Class V in Clay Basin. Clay Basin is rated as VRM Class V because of extensive oil and gas development (BLM 1975, 1977b, 1979b, 1981c, 1983d).

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-9
**TOTAL MILES AND ACRES OF VISUAL RESOURCE MANAGEMENT CLASSES
 AFFECTED BY THE PROPOSED ACTION**

Component and Location	Existing VRM Class ¹	Number of Miles Affected	Acres of VRM Class Affected
Pipeline			
MP 0-12	IV	12.0	144
MP 12-37.5	III	25.5	306
MP 37.5-41	II	3.5	42
MP 41-42	III	1.0	12
MP 42-44.5	IV	2.5	30
MP 44.5-65.5	III	21.0	252
MP 65.5-69	IV	3.5	42
MP 69-77	III	8.0	96
MP 77-84	IV	7.0	72
MP 84-93.5	II	9.5	85.5
MP 93.5-99	V	5.5	49.5
MP 99-100	IV	1.0	9
MP 100-101.5	II	1.5	13.5
MP 101.5-103	III	1.5	13.5
MP 103-106	II/III	3.0	27
MP 106-108	II	2.0	18
MP 108-109	III	1.0	9
MP 109-115	IV	6.0	54
MP 115-121.5	III	6.5	63
MP 121.5-136	IV	14.5	174
MP 136-143	III	7.0	84
MP 143-145	II	2.0	24
MP 145-165.5	IV	20.5	246
MP 165.5-171	III	5.5	66
MP 171-176 (end)	IV	5.0	60
Microwave Stations²			
Wilkins Peak	III	—	0
Grizzly Ridge	R (II) ³	—	0
Tepee Mountain	IV	—	0
Blue Mountain	III	—	0
Raven Ridge	III	—	0
SCADA Terminals⁴			
MP 38	II	3.0	7 ⁵
MP 52.5	III	0.5	1
MP 90	II	0.0	0
MP 123.5	IV	0.0	0
MP 143	II/III	0.5	1

¹Refer to Appendix 8, Visual Resource Management Methodology, for definitions of terms.

²All microwave stations would involve adding new antennas to existing facilities; therefore, no new acres would be affected.

³R = Retention Visual Quality Objective in the Forest Service Visual Management System, which most closely relates to a VRM Class II classification in the BLM VRM System (FS 1974). (Grizzly Ridge is located in the Ashley National Forest.)

⁴SCADA terminals would be included within the pipeline right-of-way; therefore, the miles shown indicate the length of the electrical distribution lines.

⁵Acreages are shown for the electrical distribution lines at 2.2 acres/mile for approximately a 20-foot width.

DIRECT IMPACTS

The Contrast Rating System (BLM 1978), which analyzes contrasts in form, line, color, and texture of

the landscape and the time needed for an impact to be reduced to an acceptable condition, was used to determine impacts. This rating system is summarized in

PROPOSED ACTION—VISUAL RESOURCES

Appendix 8, Visual Resource Management Methodology.

The visual contrast was evaluated only for the residual effects of construction activities such as surface scars, removed vegetation, and finished structures. The Proposed Action would disturb the topographic landform, remove vegetation, and introduce new structures to the landscape.

Construction crews and equipment would be visible only temporarily and, therefore, would not have a significant impact on the visual resources of the area. Changes that would occur during construction and through the first year of the project are considered temporary and, therefore, insignificant. Changes that would occur from 3 to 5 years following construction are considered short term, and changes that would be evident throughout the life of the project and beyond would be considered long term.

Primary long-term impacts from the Proposed Action would be vegetative clearings and, to a lesser extent, modifications to landform. The microwave system would add vertical antennas and dishes to existing mountaintop communication sites. Because these facilities would be placed at higher elevations in visually sensitive areas, they tend to continue to add adverse geometric structures to the landscape. SCADA terminals would add antennas, support buildings and fences, and power distribution lines to the landscape.

Visual resource changes that would not meet the standards for the VRM class of the area in which they occur would be considered as significant, adverse impacts. These impacts are described for the Proposed Action in Table 2-10.

CUMULATIVE IMPACTS

Analyzing the cumulative visual resource effects of building the Proposed Action alongside existing pipelines and simultaneously with the proposed Chevron Phosphate Project can only be done in a subjective manner that reflects the landscape character change.

Vegetative clearings during construction of the CO₂ and phosphate slurry pipelines would cause primary, significant visual resource impacts. Existing clearings may generally be acceptable for the VRM classes in which the projects occur. Additional clearings for the interrelated pipeline projects may create more visual contrast that could cause unacceptable impacts. In other words, the increase in impacts as a result of the cumulative effects may not be significant by themselves, but together would begin to affect the regional landscape character.

The general *sense* or visual image of the region would begin to change with increased development as the network of linear systems begins to create modified patterns on the landscape. The regional character would change from a predominantly natural landscape to one that is highly modified.

Significant changes in landscape character from cumulative project impacts would occur in areas most visible to the public and in areas of higher scenic quality. Examples include areas viewed from Interstate Highway 80, US Highways 191 and 40, and the Green River. Areas viewed by recreationists, visitors, and homeowners in the Browns Park, Green River Scenic Corridor ACEC, *Rye Grass Draw*, and *Red Creek Basin* areas would be highly affected.

The proposed microwave sites would be expansions of existing facilities, and the cumulative effect may continue to create a change in landscape character. Continued addition of new communication structures may reach an unacceptable level of visual change because of the form, line, color, and textural change of the structures with the surrounding landscape.

SUMMARY OF IMPACTS

A total of 120 acres would be significantly affected by the Proposed Action in VRM Class II areas and 40 acres would be significantly affected in VRM Class III areas. The primary cause of visual resource impacts would be the vegetative clearing needed for the proposed pipeline. Other landform changes and the addition of antennas for the microwave system and the SCADA terminals and distribution lines as structural contrasts would be created by the Proposed Action. Generally, the modifications would not meet the standards of the VRM classes for the areas where the project would be located.

Cultural Resources

IMPACT SIGNIFICANCE CRITERIA

Impacts to cultural resources were considered significant if:

- any information was lost that impeded efforts to reconstruct the prehistory or history of the region; and
- impacts occurred to any cultural resource on or eligible for inclusion on the National Register of Historic Places.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-10
LONG-TERM SIGNIFICANT ADVERSE VISUAL RESOURCE IMPACTS CAUSED BY
THE PROPOSED ACTION

Component and Location	Existing VRM Class ¹	Acres Significantly Affected	Primary Viewpoints	Impacts
Pipeline				
MP 37.5–38.5	II	12	Green River (Green River Crossing)	Contrasts in vegetative clearing for pipeline crossing
MP 48–50.5	III	30	Interstate Highway 80	Contrasts in vegetative clearing for pipeline
MP 84–86	II	18	US Highway 191 (Red Creek Basin Escarpment, Red Creek Badlands)	Contrasts in landform modification and vegetative clearing for pipeline construction
MP 87.5–93	II	50	US Highway 191	Contrasts in vegetative clearing for pipeline
MP 106–107	II	9	0.5 mile each side of Green River within Green River Scenic Corridor ACEC (Green River crossing)	Contrasts in vegetative clearing for pipeline and a structural contrast with the block valves
MP 108–110	II	18	Green River (Rye Grass Draw)	Contrasts in landform modification and vegetative clearing for pipeline
MP 142–143.5	II III	5 9	Green River and Dinosaur National Monument	Contrasts in vegetative clearing for pipeline
Microwave Stations²				
Wilkins Peak	III	0	US Highway 191	Additional cumulative structural contrast of existing antennas and building
Grizzly Ridge	R (II) ³	0	Utah State Highway 44,	Additional cumulative structural recreation sites, and possibly contrast of existing antennas and from summer homes building
Tepee Mountain	IV	0	US Highway 191	Additional cumulative structural contrast of existing antennas and building
Blue Mountain	III	0	US Highway 40	Additional cumulative structural contrast of existing antennas and building
Raven Ridge	III	0	US Highway 40 and Rangely	Additional cumulative structural contrast of existing antennas and building

PROPOSED ACTION—VISUAL RESOURCES

TABLE 2-10 (Concluded)

LONG-TERM SIGNIFICANT ADVERSE VISUAL RESOURCE IMPACTS CAUSED BY THE PROPOSED ACTION

Component and Location	Existing VRM Class ¹	Acres Sig- nificantly Affected	Primary Viewpoints	Impacts
SCADA Terminals				
MP 38	II	7 ²	Green River	Structural contrasts from the addition of terminals and distribution lines
MP 52.5	III	1	US Highway 191	Structural contrasts from the addition of terminals and distribution lines
MP 90	II	0	US Highway 191 and the Red Creek Badlands WSA	Additional cumulative structural contrast of phosphate booster station
MP 143	II/III	1	Access road to Dinosaur National and the Green River	Contrasts from the addition of terminals and distribution lines

¹Refer to Appendix 8, Visual Resource Management Methodology, for definitions of terms.

²All microwave stations would involve adding new antennas to existing facilities; therefore, no new acres would be affected.

³R = Retention Visual Quality Objective in the Forest Service Visual Management System, which most closely relates to a VRM Class II classification in the BLM VRM System (FS 1974). Grizzly Ridge is located in the Ashley National Forest.

⁴Acres would be significantly affected by the addition of the electrical distribution lines. The SCADA terminal facilities would be included within the pipeline right-of-way.

AFFECTED ENVIRONMENT

An overview *(Cultural Resource Inventory Class I)* study of the project area was performed by reviewing previous archaeological and historical works. Summaries of the cultural resources in the Uinta Basin are found in *Class I Overview Study of the Vernal District*, BLM (Jones and MacKay 1980) and *Archaeological Inventory in the Seep Ridge Cultural Study Tract, Uintah County, Northeastern Utah* (Larralde and Chandler 1981). A summary of the cultural resources in the Green River Basin was prepared by Woodward-Clyde Consultants for the Chevron Phosphate Project (BLM 1983c).

The Rangely CO₂ Pipeline Project area lies within the Uinta Basin of the Colorado Plateau as described by Stokes (1979) and within the Green River Basin in

Wyoming (BLM 1982). In the Uinta Basin, over 1,300 sites have been identified and recorded and include the following sequence of cultural periods: Paleo-Indian complexes, Archaic cultures, Uintah-Fremont cultures, and Numic-Speaking (Ute/Shoshonean) cultures (Larralde and Chandler 1981; Forsyth 1980). In the Green River Basin, the sequence of culture periods ranges from Paleo-Indian to Archaic to Late Prehistoric. In the Late Prehistoric culture period, both Fremont and Shoshonean cultures have been identified (Chevron 1982b; Phillips 1982).

Few cultural resource sites of the Paleo-Indian period have been identified within the project area. However, significant sites with Paleo-Indian materials have been found within 20 to 50 miles of the proposed project in Wyoming (Frison 1978; Sharrock 1966; Day and Dibble

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

1963; Jennings 1978; Moss and others 1951). The most common types of cultural resource sites are surface campsites with hearths and limited activity sites with varying concentrations of lithic materials. Many of these sites are indicative of the Archaic culture period.

The historic period for the project area began with the William Henry Ashley Expeditions of the North American Fur Company in 1824 and Ashley's float down the Green River in 1825 (Morgan 1964). Browns Hole was a rendezvous site for early mountain men because of its relationship to rich fur bearing regions. However, the beaver fur trade came to an end in the late 1830s.

In 1850 and 1856, Captain Stansbury and Lieutenant Bryan surveyed a central east-west route (Goetzmann 1959). This route became known as the Stansbury-Bryan route and followed Bitter Creek from Rock Springs, Wyoming, west to the Green River. During the late 1850s, the route was used by Cherokee Indians and was also known as the Cherokee Trail. A southern route along Currant Creek to the Green River was identified by Walker (1980) and Gardner (1981) as the most prevalent trail used by the Cherokee. Therefore, the southern route is sometimes called the Cherokee Trail and the Stansbury-Bryan route, the Overland Trail.

During the 1860s, stage companies operated over parts of the Cherokee and Overland Trails. The trails were later paralleled by the railroad. The pipeline would cross Bitter Creek Valley approximately 5 miles east of Green River, Wyoming.

After the railroad was completed in 1869, settlers moved into the area and established cattle and sheep ranches. Browns Hole became Browns Park and a stronghold for outlaws and cattle rustlers. In 1880, John Jarvie moved into Browns Park and opened a general store on the bank of the Green River (Tennent 1981).

Gilsonite, gypsum, and asphalt were mined in the Uinta Basin after 1886 (Bender 1980). Other mineral development occurred after 1900. The historic sites in the area include trails of the early pioneers, railroad and telegraph lines, and remnants of military, ranching, and mining activities.

Pipeline. Portions of the pipeline *corridor* have been surveyed for the MAPCO natural gas pipeline (Collins and others 1980) and Trailblazer natural gas pipeline. In addition, there have been Mountain Fuel Supply Company (Lindsay 1977) and BLM surveys (Decker 1982; Phillips 1982). Over 120 known cultural sites have been identified within a 1-mile-wide corridor of the Proposed Action route: 62 sites in Wyoming, 42 sites in Utah, and 16 sites in Colorado. Most sites are *lithic

scatters* and campsites of undetermined age that are either ineligible for the National Register of Historic Places or have not been evaluated. Significant sites within the corridor include the Pony Express Trail, the Oregon and Mormon Pioneer National Historic Trails, the Bryan-South Pass City Historic Trail, the Green River-South Pass Stage Road, the Overland Trail, the Cherokee Trail, a multi-component campsite, Doc Parson's Cabin, and Doc Parson's smelter. These sites are either on or determined eligible for listing on the National Register of Historic Places. The Proposed Action would cross the eastern portion of Whiskey Basin near the La Barge gas plant. The Basin is an area of high cultural resource site probability. The John Jarvie Ranch historical site is located 1.5 miles west of the proposed corridor. Between MP 75 and 81 is an area of high site probability. The Richards Gap area along the Wyoming-Colorado border is also an area of high site probability. Several isolated cultural finds, lithic scatters, and other prehistoric sites have been inventoried west of the Rangely well field area (Western Cultural Resource Management 1983; Meese 1976).

Microwave System. All five microwave repeater sites would be located at existing sites on mountain peaks. Since the mountain peak sites have already been disturbed, the likelihood of finding any significant cultural resource sites intact would be small. However, the survey requirements (Appendix 3) would also apply to the existing microwave sites.

DIRECT IMPACTS

Construction of the Proposed Action would cause land disturbance and modification to any cultural resources within the area. Cultural impacts could include destruction or alteration of the resource, displacement of artifacts, and alteration of the surrounding environment. Scientific and cultural information and portions of the resource base for future research could be lost. The loss of any information could have a significant impact on efforts to reconstruct the prehistory and history of the region.

Since the exact locations of the project components are unknown, specific impacts cannot be predicted. With effective use of the intensive cultural surveys and compliance procedures described in Appendix 3, significant cultural resource impacts should not occur.

No direct impact would occur to the John Jarvie Ranch historical site from construction or operation of the Proposed Action. Since a caretaker resides on this site, impacts from vandalism should be minimal.

PROPOSED ACTION—RECREATION RESOURCES

CUMULATIVE IMPACTS

Construction of the Proposed Action combined with the Chevron Phosphate Project (MP 80 to 120) could affect more cultural sites because more acres would be disturbed. Cultural sites may be difficult to avoid in areas with constricted topography, such as head of *Rye Grass Draw*, *Jesse Ewing Canyon*, and *Richards Gap*. If significant cultural resources in these areas cannot be avoided, mitigation would occur before construction.

SUMMARY OF IMPACTS

Impacts to cultural resources should not occur with intensive use of the cultural surveys and compliance procedures described in Appendix 3. Since the exact locations of the Proposed Action facilities are unknown, specific impacts to cultural sites cannot be predicted.

Recreation Resources

SIGNIFICANCE CRITERIA

Impacts to recreation were considered significant if:

- demand in the recreation area increased by 10 percent or more over baseline conditions;
- 10 percent or more of the land used for developed recreation facilities or visually sensitive areas were permanently altered;
- the quality of floatboating on the Green River and other dispersed recreation were reduced and the public's expectation for a quality recreational experiences diminished.

AFFECTED ENVIRONMENT

The recreation area of influence is shown in Map 2-1. The area includes those lands that would be affected by project construction and operation activities and the recreation resources that would attract project-related population. *Dispersed recreation* is the primary recreational opportunity occurring within the area of influence. Dispersed recreation is defined as camping and day use activity. Dispersed recreation includes hunting, fishing, floating the Green River, ORV use, sightseeing, picnicking, and wildlife observation.

The majority of the land in the study area is federally administered. In addition, the area has a number of

developed recreation facilities that are administered by both federal and local agencies. (Table 2-11 identifies the developed recreation resources.)

Hunting. Probably the most important recreational pursuit in the area of influence is hunting. The vast, relatively undeveloped natural resources in the area provide hunting opportunities for big game (deer and pronghorn) as well as small game animals, upland birds (sage grouse), and waterfowl (geese and ducks). Historically, the greatest variety and concentrations of animals in the area have been on Forest Service administered lands (Ashley, Routt, and White River National Forests), BLM-administered lands, and along the Green River drainage. The 14,376-acre Seedskadee National Wildlife Refuge (Map 2-1) also provides hunting opportunities for deer, antelope, upland game, and waterfowl as well as wildlife observation opportunities. Four-wheel drive is often necessary since access in the area of influence is generally provided by gravel roads and two-track trails.

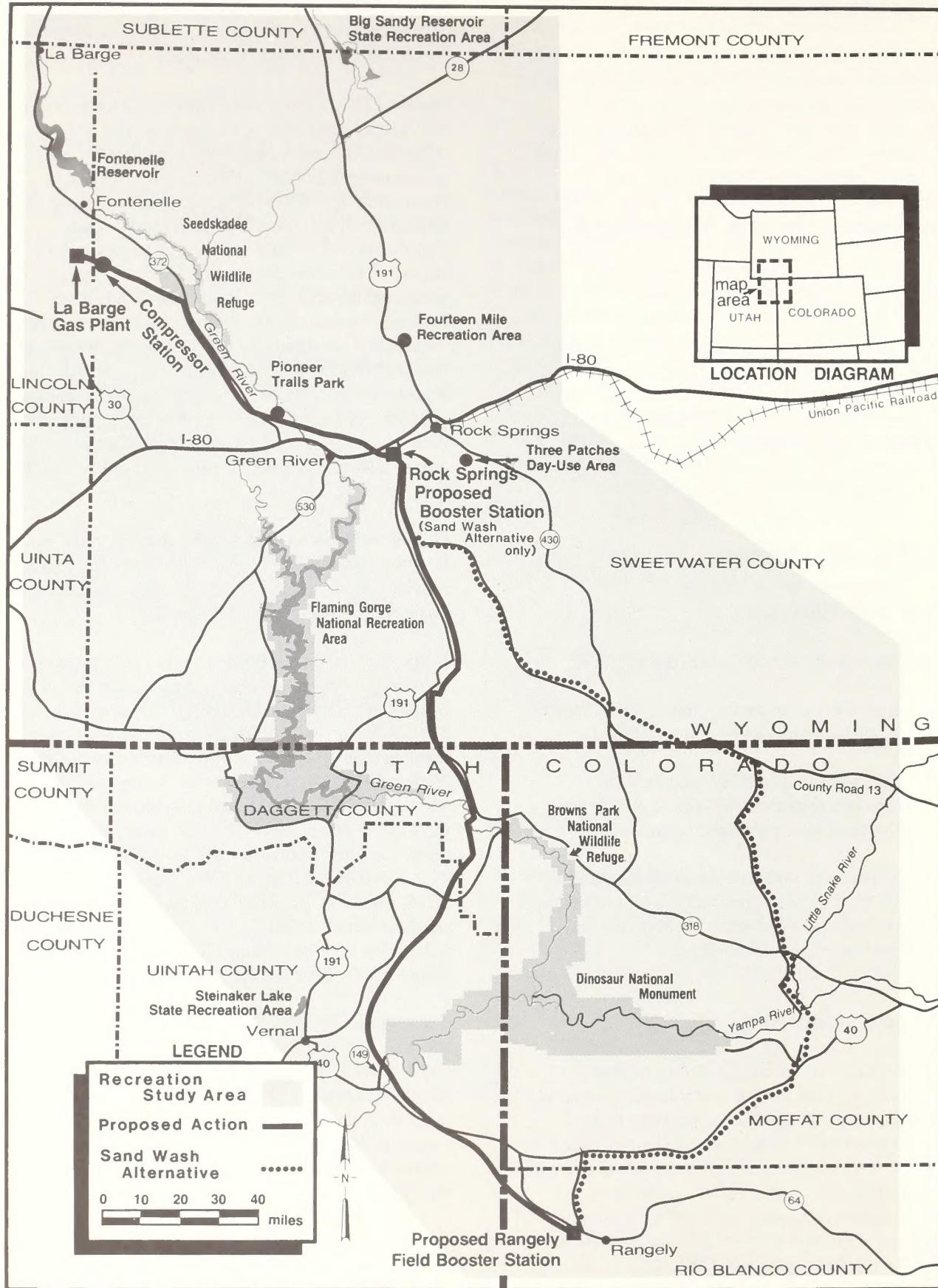
Fishing and Floatboating. Fishing usually occurs with floatboating along the Green River. The Green River provides important recreation opportunities for fishing, floatboating, and dispersed camping.

Portions of the Green River have also been recognized nationally for their free-floating characteristics and floatboating opportunities. The NPS (1983) determined that 91 miles of the Green River from the Flaming Gorge Dam downstream to the southern boundary of Dinosaur National Monument is eligible for designation as a Wild and Scenic River. The 32-mile-long Browns Park segment of the Green River is now proposed as *scenic* rather than *recreational* as was stated in the NPS draft EIS (*Federal Register* 1983). Between MP 103 and 106.5, within the Browns Park area, the proposed pipeline would parallel and cross the Green River. Table 2-12 shows the floatboating use of the Green River from Little Hole to Browns Park.

The proposed pipeline would cross the Green River at MP 143. This point would be within the segment of the Green River inventoried by the NPS under the *Nationwide Rivers Inventory* program. The Green River from Range Creek upstream to the Yampa River (a total of 193 miles) has been identified as having national significance, and as a potential candidate for Wild and Scenic River status (NPS 1982).

DIRECT IMPACTS

Some increased use of recreation facilities is expected to occur in the summer of 1985 during peak construction.



MAP 2-1 RECREATION STUDY AREA

PROPOSED ACTION—RECREATION RESOURCES

*TABLE 2-11
DEVELOPED RECREATION RESOURCES IN THE STUDY AREA*

Recreation Site	Administering Agency ¹	Location	Attraction/Use Restrictions
Fourteen-Mile Recreation Site	BLM	North of Rock Springs	Picnic tables and fishing opportunities. Day use only.
Three Patches	BLM	Southeast of Rock Springs	Day use area, picnic.
Flaming Gorge National Recreation Area	FS	Southwest of Rock Springs	Camping, fishing, float-boating and boating, hiking, and sightseeing.
Dinosaur National Monument	NPS	East of Vernal	Camping, floatboating, hiking, sightseeing.
Fontenelle Reservoir Campground and Marina	BuRec	Fontenelle Reservoir	Weeping Rock Campground, marina, boating, and fishing opportunities.
Seedskadee National Wildlife Refuge	FWS	Southwest of La Barge	Wildlife observation and hunting. Seasonal closures, limited vehicle travel.
Big Sandy Recreation Area	WY	North of Farson	Day use area with picnic tables. Poor fishing.
Pioneer Trails Parks	County	North of Green River	Day use area with picnic area and fishing.
Steinaker Lake State Recreation Area	UT	North of Vernal	Day use area for fishing and boating. Campgrounds.

¹Agency codes: FS-Forest Service; NPS-National Park Service; BLM-Bureau of Land Management; BuRec-Bureau of Reclamation; FWS-U.S. Fish and Wildlife Service; WY-State of Wyoming; UT-State of Utah; County-Sweetwater County, Wyoming.

Because of the number of facilities in the area, the increased use of any one recreation site is not expected to exceed the 10 percent significance criterion. Therefore, impacts to recreation sites from the Proposed Action would not be significant.

Impacts to the quality of dispersed recreation (primarily hunting and fishing) from the construction work force are anticipated to be minimal and insignificant. Total recreation demand based upon projected population increases in the area of influence is not expected to exceed 10 percent over baseline conditions. (Refer to the Socioeconomics section for statistics.) The area of influence has a relatively low population density compared to the availability of recreation acreage.

The Proposed Action would cross the Green River at MP 38, 106.5, and 143. At each river crossing, fishing quality and other recreational values could diminish for up to 7 workdays during construction and pipeline trenching. The quality of user experiences at popularly used dispersed camping sites along the Green River in the Browns Park area and in the vicinity of the river crossing (MP 106.5) would be diminished due to the effects on vegetation and stream bank stabilization from construction. Recreation resource values are expected to return to preconstruction levels within 2 years.

Construction equipment, dust, and noise would temporarily diminish the quality of recreational experiences at the three river crossings. River trenching activity for

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-12
GREEN RIVER FLOATING USE FROM
LITTLE HOLE TO BROWNS PARK
(1981)

Month	Boats (Week-day Use)	Boats (Week-end Use)	Average Party Size	Total People	Total Hours
April/May	10	10	3.7	74	370
Opener (May 30-31)	14	10	4.5	63	315
June	63	88	4.5	680	3,397
July	135		4.7	563	2,815
July		111	4.0	444	2,220
August	95		3.5	332	1,662
August		105	3.8	402	2,011
September	44		2.4	93	464
September		40	4.0	160	800
October/ November	8		2.0	16	80
October/ November		10	5.0	50	248
TOTAL	369	374	3.8	2,877	14,382

Source: BLM 1983c.

Note: Floatboating takes an average of 5 hours per trip.

the Proposed Action at MP 106.5 and 143 could interrupt river running opportunities along this stretch of the river for 3 to 4 days. The Proposed Action would cross the Green River at MP 106.5 which is within a segment of the river found eligible for Wild and Scenic River designation (NPS 1983). The pipeline route would also cross the Green River at MP 143. This segment has been identified by NPS as having national significance for possible future consideration for Wild and Scenic River status.

CUMULATIVE IMPACTS

Cumulative impacts from the Proposed Action and phosphate slurry pipelines would be the same as the Proposed Action alone except for the crossing of the Green River at MP 106.5. At this point, the simultaneous construction of the CO₂ and phosphate slurry pipelines could last up to 10 days and interrupt floatboating up to 7 days. However, this impact would still be considered short term and insignificant.

SUMMARY OF IMPACTS

Direct and cumulative impacts to dispersed recreation opportunities and demand upon developed recreation sites would be insignificant, since they would be minimal and short term (one season).

Wilderness

SIGNIFICANCE CRITERIA

Impacts were considered significant if:

- any project component(s) crossed the boundary of a *Wilderness Study Area (WSA)* managed under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (BLM 1979c) and Section 603(c) of the Federal Land Policy and Management Act of 1976 causing permanent and substantially noticeable intrusions upon wilderness characteristics; or
- permanent and substantially noticeable intrusions (outside sights and sounds) affected the natural quality of the wilderness or WSA units or otherwise affected user opportunities for solitude or primitive recreation.

AFFECTED ENVIRONMENT

The Proposed Action route would parallel the northwest boundary of the Red Creek Badlands WSA for approximately 3 miles (MP 82 through 85). The Red Creek Badlands Unit (WY-040-406), which is located approximately 35 miles south of Rock Springs and 5 miles north of the Utah-Wyoming state line (Map A1-1), was identified by the BLM as a WSA (1981b). The unit contains approximately 8,020 acres and is considered a highly scenic area, a fragile watershed, a valuable wildlife area, and a popular deer and elk hunting area (BLM 1984b). Until Congress decides on its final status, the WSA must be managed by the BLM so as to not

PROPOSED ACTION—TRANSPORTATION NETWORKS

impair its wilderness characteristics (see nonimpairment criteria, Section 603(c) of the Federal Land Policy and Management Act, 1976) (BLM 1979c)).

DIRECT IMPACTS

The Proposed Action would not have any significant, long-term direct effects on wilderness, since no project components would directly cross the boundary of a WSA. Indirect impacts, such as dust from construction activities, would also be insignificant since impacts would be short term (4 to 6 weeks) and temporary causing no permanent change to any wilderness-related values. The 100-foot-long, 220 volt power distribution line to the block valves at MP 90 could be seen from the Red Creek Badlands WSA, several miles away.

However, because of the distance, impacts would not be significant.

Cumulative impacts would be the same as direct impacts since the CO₂ and phosphate slurry pipelines would be built simultaneously.

SUMMARY OF IMPACTS

No significant impacts to the wilderness resource is anticipated because no project component would cross the boundary of any WSA. Indirect impacts are also expected to be insignificant since construction activities will be short term (one season) and temporary.

Transportation Networks

SIGNIFICANCE CRITERIA

Impacts to transportation networks were considered significant if:

- the addition of project-generated auto and truck demand accelerated the deterioration and related maintenance costs scheduled by the responsible agency;
- the increase in vehicle miles of travel (VMT) resulted in an increase in vehicle accidents;
- the volume to capacity relationship caused stable traffic flow to fall below level C (safe operation level);
- a road was blocked for longer than 15 minutes at any one time; or

- normal product flow of existing pipelines were interrupted for any period of time.

AFFECTED ENVIRONMENT

The primary area of influence for transportation networks includes existing networks (road, rail, pipeline, or air) in Lincoln and Sweetwater counties in Wyoming, Uintah and Daggett counties in Utah, and Rio Blanco County in Colorado. The roadways affected by the Proposed Action are mainly used for traffic movement and access between the population centers of Green River and Rock Springs, Wyoming; Vernal, Utah; and Rangely, Colorado plus the Dinosaur National Monument and Flaming Gorge National Recreation Area.

The transportation analysis for the Proposed Action included an interstate highway, primary and secondary paved roads, and gravel and primitive dirt roads. The major highways are Interstate Highway 80, Wyoming State Highway 372, US Highways 191 and 40, Utah State Highway 149.

The Wyoming Department of Transportation (WDOT) has indicated the project-related roadway segments of Wyoming State Highway 372 and US Highway 191 have a low *annual average daily traffic (AADT)* accident rate and actual accidents (BLM 1983a). According to the Utah Department of Transportation (UDOT), US Highway 40 has a heavy year-round traffic volume (BLM 1983a). The annual average truck traffic on US Highway 40 between Vernal and the Colorado state line exceeds 20 percent of the traffic volume. Colorado Department of Transportation (CDOT) indicates project related roadway segments of Colorado State Highway 64 between the Utah state line and Rangely Weber Sand Unit oil field have an above average accident rate. July and August are the peak volume months for the above road segments because of increased tourist traffic.

Access through *Jesse Ewing Canyon* and Browns Park is provided by an unnumbered Daggett County road. The road surface in this 10-mile-long segment changes from a gravel road to a primitive dirt road with some steep grades. The road is primarily used by local ranchers and residents of vacation homes in the area. Recreational travel (floatboaters) increases during the summer and in the fall when big game hunters use the area roads. During June, July, and August, Utah State Road 149, which is the access road to Dinosaur National Monument, has a high daily traffic volume.

The Proposed Action would parallel existing roads or pipeline installations for 163 miles or 92 percent of the total pipeline length. These existing facilities include Wyoming State Highway 372 from MP 13 to 38, the

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Trailblazer natural gas pipeline between MP 38 and 52, the Mountain Fuel pipeline between MP 52 and 59, the MAPCO liquid hydrocarbon pipeline between MP 59 and 168, and the Northwest pipeline from MP 168 to the well field. From the top of *Red Creek Basin Escarpment* down to the Green River and back to the head of *Rye Grass Draw*, the Proposed Action would not only parallel MAPCO's existing line but would be constructed simultaneously with the proposed phosphate slurry pipeline.

DIRECT IMPACTS

The Proposed Action would increase the volume of traffic during construction. This increase would occur on segments of Wyoming State Highway 372, US Highways 191 and 40, Utah State Highway 149, and Colorado State Highway 64. Depending on the traffic flow, primarily before and after work, this increase could cause the traffic flow to fall below safe operation levels, which based on the significance criteria, would be a significant impact. However, this impact would be short term and occur only sporadically during construction. The increase in traffic could cause increases in accidents, which exceeds the significance criterion that any increase in accidents would be a significant impact. The majority of the intersections would not be significantly affected by the flow of project material and personnel due to low existing traffic flow and road design. All the traffic impacts associated with the Proposed Action would be short term, lasting 8 weeks or less.

Roads affected by increased traffic (primarily heavy trucks depositing mud on paved and graveled roads during periods of wet weather) could require some additional maintenance by agencies responsible for road maintenance. Increased truck traffic on various county gravel and dirt roads could also further deteriorate the roads, adding to the scheduled maintenance costs. Depending on the conditions of these roads and the existing maintenance budget, the increased use could increase the need for maintenance beyond that currently scheduled. This would be a significant impact based on the significance criteria because normal deterioration and maintenance costs would be exceeded.

The significance criterion of "existing roads being blocked for longer than 15 minutes" could be exceeded in two locations: (1) *Jesse Ewing Canyon* (MP 99.5 to 102.5) and (2) along Utah State Highway 149 (MP 142). Traffic to and from Browns Park and Dinosaur National Monument could be affected by these blockages. Any blockage of traffic flow at these points in excess of 15 minutes would be a significant impact.

The significance criterion of interrupting "the product flow of existing pipelines during construction" would be

exceeded only if appropriate construction practices were not used in those stretches of the pipeline which lie adjacent to existing pipelines. Any interruption of flow would be a significant impact. The flow of other pipelines could also be interrupted during maintenance and repair, or if the CO₂ pipeline ruptured. If these occurred, impacts would be significant.

CUMULATIVE IMPACTS

The cumulative traffic volume impacts associated with the interrelated phosphate slurry and CO₂ pipelines during the summer of 1985 would have the following significant impacts:

- (1) lower the *level-of-service below C* for a short period of time on specific roadway segments of Wyoming State Highway 372, US Highways 191 and 40, Utah State Highway 149, and Colorado State Highway 64;
- (2) increase traffic accidents proportionally to the increase in the number of vehicle miles; and
- (3) increase traffic congestion at specific intersections.

All the traffic volume and traffic flow impacts would be short term (during construction).

Construction of the CO₂ pipeline along with the phosphate pipeline would have a significant, beneficial impact to the *Jesse Ewing Canyon* road. The pipeline construction would aid the county in developing an improved road through this area, thus improving access into and out of Browns Park.

SUMMARY OF IMPACTS

Transportation impacts are anticipated to be significant because

- Short-term traffic volume impacts to specific roadway segments, from increased vehicle trips would result in a class of service falling below C (standard level);
- Normal product flow of an existing pipeline that parallels the Proposed Action could be interrupted;
- Short-term traffic accident impacts could increase with increased traffic volume;
- Road deterioration and maintenance costs could

PROPOSED ACTION—AIR QUALITY

increase due to heavy equipment and material being hauled on dirt roads during wet weather; and

- Roads would be blocked for longer than 15 minutes in some locations during construction.

air quality standards, prevention of significant air quality deterioration, and protection of air quality-related values such as visibility.

Air Quality

IMPACT SIGNIFICANCE CRITERIA

Impacts to air quality were considered significant if the primary and secondary *national ambient air quality standards (NAAQS)* and state ambient air quality standards (Table 2-13) or the *prevention of significant deterioration (PSD)* regulations that apply to this project were violated. The significance of predicted air quality impacts is based on established state and federal air quality program requirements for maintaining ambient

AFFECTED ENVIRONMENT

The study area has a mild, semi-arid *continental climate.* Large-scale meteorological influences in the project area are relatively weak. The *microclimate* from location to location varies with changes in latitude, elevation, and local topography. Strong winds and dust storms are common natural occurrences in the area and often result in high particulate concentrations.

The existing air quality of the area affected by the Proposed Action is well within federal, Wyoming, Utah, and Colorado ambient air quality standards for gaseous pollutants. Concentrations of total suspended particulates (TSP) in the whole project area have been

*TABLE 2-13
FEDERAL AND STATE AIR QUALITY STANDARDS
(micrograms per cubic meter - $\mu\text{g}/\text{m}^3$)*

Pollutant	Averaging Time ^a	FEDERAL STANDARDS						STATE STANDARDS					
		AMBIENT ^b			PSD INCREMENTS ^c			COLORADO STANDARDS		UTAH STANDARDS		WYOMING STANDARDS	
		Primary	Secondary	Class I	Class II	Class III	Primary	Secondary	Primary	Secondary	Primary	Secondary	
Sulfur Dioxide	Annual	80	—	2	20	40	—	—	80	—	60	—	
	24-Hour	365	—	5	91	182	—	—	365	—	260	—	
	3-Hour	—	1,300	25	512	700	700	—	—	1,300	—	1,300	
Total Suspended Particulates	Annual	75	60	5	19	37	75	60	75	60 ^d	60	—	
	24-Hour	260	150	10	37	75	260	150	260	150	150	—	
Nitrogen Dioxide	Annual	100	—	—	—	—	100	—	100	—	100	—	
Ozone	1-Hour	240	—	—	—	—	235	—	235	—	160	—	
Carbon Monoxide	8-Hour	10,000	—	—	—	—	10,000	—	10,000	—	10,000	—	
	1-Hour	40,000	—	—	—	—	40,000	—	40,000	—	40,000	—	
Lead	Quarterly	1.5	—	—	—	—	—	—	—	—	—	—	

Source: Dietrich and others 1983.

^a Short-term standards (those other than Annual and Quarterly) are not to be exceeded more than once each year.

^b Ambient standards are the absolute levels allowed to protect either public health (primary) or welfare (secondary).

^c Prevention of Significant Deterioration (PSD) standards are the maximum incremental increase levels allowed above the baseline amounts of pollutants in regions of clean air.

^d The Colorado annual secondary TSP standard was established as a guide in assessing implementation plans to achieve the 24-hour standard.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

measured that are above TSP ambient air quality standards. This can be attributed to occasionally high natural background or *fugitive dust* conditions characteristic of dry western climates. Because of natural causes, the TSP standard is being violated; therefore designation as a *non-attainment area* has not been declared. The significance of TSP violations will be reduced when the Environmental Protection Agency (EPA) implements a respirable (fine) particulate standard that will regulate particulate matter less than 10 microns (PM 10). The majority of natural TSP are greater than 10 microns in diameter and, therefore, would not contribute to violation of the proposed new standard (Dietrich and others 1983).

DIRECT IMPACTS

The construction of the Proposed Action would create emissions of both particulate matter and gaseous pollutants during construction. Construction sources would include site-preparation activities, right-of-way clearing, vehicle travel over unpaved roads, pipeline burial, and heavy equipment operation. Emission rates along the Proposed Action route would be similar to emissions for pipeline construction and operation as described in the *Chevron Phosphate Project EIS* (BLM 1983c), which are below significance levels. The construction work and the impacts on air quality will be transient and temporary in nature and, therefore, insignificant.

No significant emissions are expected from the operation of the Proposed Action because the pipeline right-of-way would be reclaimed.

A positive impact would be the decrease in the amount of CO₂ vented to the atmosphere at the La Barge gas treatment plant. The decrease would be approximately equal to the amount of CO₂ that would be transported in the pipeline (200 mmcf/d). Any CO₂ production above the pipeline capacity would have to be vented or sold if possible. Instead of being vented at the La Barge gas plant site, the CO₂ would be injected for *enhanced oil recovery* at the Rangely Weber Sand Unit oil field, continuously recycled and, at the end of the project life, permanently stored underground in the well field.

CUMULATIVE IMPACTS

Two interrelated projects were analyzed for possible cumulative air quality impacts. The construction and operation of the La Barge gas plant and the Chevron Phosphate Project were analyzed for air quality impacts. Detailed air quality impacts of these interrelated projects are described in the *Riley Ridge Natural Gas Project*

EIS and *Chevron Phosphate Project EIS* (BLM 1983a and 1983c).

The impacts would be additive only during the construction phase of the Proposed Action, because this is the only phase when the Proposed Action would generate noticeable emissions. No increase in emissions is predicted since the distance between the interrelated projects and the Proposed Action would be too great for the emissions to combine; therefore, the cumulative impacts to air quality would be insignificant.

SUMMARY OF IMPACTS

Air quality impacts are anticipated to be insignificant for the following reasons:

- Impacts would be temporary and occur only during the construction phase.
- Impacts would be spread over a large geographic area.
- Impacts from fugitive dust and gaseous emissions would be localized and would not affect regional air quality.

CO₂ from the La Barge gas plant would be sold, causing a permanent but positive cumulative impact by decreasing vented CO₂ into the atmosphere.

Paleontological Resources

IMPACT SIGNIFICANCE CRITERIA

Impacts to paleontological resources were considered significant if:

- pipeline construction destroyed paleontological resources that would have contributed to knowledge of prehistoric species.

AFFECTED ENVIRONMENT

The Proposed Action would cross at least one area that could contain paleontological resources. During construction of the MAPCO pipeline below the *Red Creek Escarpment*, a fossil crocodile skull was discovered. The academic community considered this an important find.

DIRECT IMPACTS

Construction of the Proposed Action could uncover additional paleontological resources in the vicinity of the *Red Creek Escarpment*. However, important paleontological resources should not be destroyed and knowledge of prehistoric species should not be lost because the general resource measures identified in Appendix 3 require that a paleontologist conduct surveys before any disturbance and be present during pipeline construction. Because of this, important resources could be discovered and knowledge could be increased.

Cumulatively, construction of the Proposed Action and the Chevron Phosphate Project could increase the potential for additional paleontological resources to be discovered.

SUMMARY OF IMPACTS

During construction of the MAPCO pipeline below the *Red Creek Basin Escarpment*, an important fossilized crocodile skull was discovered. The potential exists for future discoveries to occur during construction of the Proposed Action.

Land Use Constraints and Conflicts

IMPACT SIGNIFICANCE CRITERIA

Impacts were considered significant if:

- any conflicts were identified between the proposed pipeline and oil, gas, coal and trona mining activities or lease areas which could interrupt or hamper the recovery of the resource.

AFFECTED ENVIRONMENT

The Proposed Action would cross several areas currently leased for oil and gas; Clay Basin is one such area. The well fields are crisscrossed with roads, and buried and aboveground pipelines ranging from 4 inches to 12 inches in diameter. The roads and pipelines are generally unmapped or poorly mapped. The Proposed Action would also cross several trona lease areas between MP 22 to MP 30.5.

DIRECT IMPACTS

The construction of the Proposed Action across oil or gas well fields would cause construction to slow down,

and the potential could arise for inadvertent damage to the small pipelines in the well field. Work in the well field would require extensive coordination between the construction company and the energy company. Damage could include ruptures from machinery trenching through an unmapped buried pipeline or crushing an aboveground pipeline with machinery. Such ruptures, if they occurred, could result in oil leaking into the soil or natural gas being released, thus risking an explosion. A rupture could interrupt petroleum resource recovery and create a health hazard. Generally, because the consequences would be serious, great care is taken to avoid accidental damage, which rarely occurs with this type of project. The impacts would meet the significance criteria but would not likely happen.

If the proposed pipeline were to cross a trona lease area above a mine, a very slight chance would exist for construction activities to cause subsidence. Continued mining in the vicinity of the pipeline could also increase the possibility of future unplanned subsidence that could damage the CO₂ pipeline.

Cumulative impacts from constructing two pipelines would include a slightly higher potential of accidental damage to small well field pipelines.

SUMMARY OF IMPACTS

The Proposed Action would cross several active oil and gas fields and trona lease areas. Construction would slow down and care would be taken to avoid the possibility of inadvertent damage to well field pipelines. A very slight possibility exists for construction activities to trigger subsidence if underground trona mines were beneath or very near the pipeline. Future subsidence triggered by mining activities, although highly unlikely, could also damage the pipeline.

SAND WASH ALTERNATIVE

The same impact significance criteria were applied to the Sand Wash Alternative as were applied to the Proposed Action.

Socioeconomics

AFFECTED ENVIRONMENT

The area of influence for the Sand Wash Alternative differs from that of the Proposed Action. The following

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

communities and counties are included in the area of influence for the analysis of population, employment, and income impacts: Green River and Rock Springs (Sweetwater County, Wyoming), Vernal (Uintah County, Utah), Craig (Moffat County, Colorado), Meeker and Rangely (Rio Blanco County, Colorado), and Steamboat Springs (Routt County, Colorado). (Refer to Appendix 5 for description of the gravity model used to determine the area of influence.) For the same reasons as described under the Proposed Action, some of the workers are expected to camp at undetermined sites near the pipeline route. Because this alternative route has fewer suitable camping sites, however, the assumption is lowered to 10 percent for this alternative.

The area of influence for the revenue analysis for the Sand Wash Alternative includes the following counties and school districts:

- Lincoln County, Wyoming
- Lincoln County School District 1
Kemmerer, Wyoming
- Sweetwater County, Wyoming
- Sweetwater County School District 1
Rock Springs, Wyoming
- Sweetwater County School District 2
Green River, Wyoming
- Moffat County, Colorado
- Moffat County School District, Colorado
- Rio Blanco County, Colorado
- Rio Blanco School District 4
Rangely, Colorado

DIRECT IMPACTS

Pipeline Construction. The Sand Wash Alternative, by itself, would not significantly affect the socioeconomic conditions as shown on Tables 2-14 and 2-15. Pipeline construction in 1985 would increase population from 2 percent in Rangely, Green River, and Rock Springs to less than 1 percent in Vernal, Craig, Meeker, and Steamboat Springs. Growth in total employment and personal income would vary from 2 percent in Sweetwater and Rio Blanco counties to 1 percent or less in Uintah and Routt counties. Per capita personal income would increase by 1 percent in Rio Blanco County and by less than 1 percent in the other counties.

Property tax revenues would rise less than 1 percent in all jurisdictions. All of these impacts would fall below the 5 percent significance criteria.

Project Operation. The long-term impacts of pipeline operation and the impacts of carrying CO₂ to the oil field at Rangely would be the same as those identified for the Proposed Action.

Cumulative Impacts

When combined with the interrelated projects (see description in Chapter 1), the Sand Wash Alternative would add to significant cumulative impacts in Lincoln and Sweetwater counties and Rock Springs. These impacts are shown in Tables 2-14 and 2-15. The cumulative impacts would be the same as those identified for the Proposed Action with the following exceptions:

- The increase in Rock Springs' population would be 10 percent.
- The increase in Sweetwater County employment would be 9 percent and in total personal income, 10 percent; and
- Rock Springs would need nine city employees.

SUMMARY OF IMPACTS

Impacts of the Sand Wash Alternative would be the same as those identified for the Proposed Action except that cumulative population growth in Rock Springs would be 10 percent, cumulative growth in Sweetwater County would be 9 percent, and cumulative personal income growth in Sweetwater County would be 10 percent.

Wildlife

AFFECTED ENVIRONMENT

The Sand Wash Alternative would cross the Green River at MP 38, the Yampa River at MP 160.5, and the Little Snake River at MP 152.

The Sand Wash Alternative would cross the following types of seasonal ranges:

- 35 miles, pronghorn fawning range	MP 2-12
	MP 18-38
	MP 205-210

SAND WASH ALTERNATIVE—SOCIOECONOMICS

*TABLE 2-14
EFFECTS TO POPULATION, EMPLOYMENT, AND INCOME
FROM CONSTRUCTION OF THE SAND WASH ALTERNATIVE*

County	Baseline	Sand Wash Alternative	Interrelated Projects	Percent above Baseline	
				Sand Wash Alternative	Cumulative
Population					
Sweetwater County	44,739	690	1,930	N/A	N/A
Green River	13,672	280	190	2.0	3.4
Rock Springs	20,812	370	1,680	1.8	9.9
Uintah County	24,000	80	0	N/A	N/A
Vernal	7,800	70	0	0.9	0.9
Moffat County	14,524	90	0	N/A	N/A
Craig	10,000	70	0	0.7	0.7
Rio Blanco County	7,246	60	0	N/A	N/A
Meeker	2,750	10	0	0.4	0.4
Rangely	2,440	45	0	1.8	1.8
Routt County	14,700	10	0	N/A	N/A
Steamboat Springs	8,970	10	0	0.1	0.1
Total Employment					
Sweetwater County	22,670	460	1,540	2.0	8.8
Uintah County	10,041	90	0	0.9	0.9
Moffat County	6,769	100	0	1.5	1.5
Rio Blanco County	3,844	70	0	1.8	1.8
Routt County	12,568	10	0	0.1	0.1
Total Personal Income¹					
Sweetwater County	\$559,100	\$ 9,880	\$ 43,950	1.8	9.6
Uintah County	204,900	2,060	0	1.0	1.0
Moffat County	153,600	2,280	0	1.5	1.5
Rio Blanco County	75,200	1,560	0	2.1	2.1
Routt County	233,500	320	0	0.1	0.1
Per Capita Personal Income					
Sweetwater County	\$ 12,497	\$ 12,525	\$ 12,942	0.2	3.6
Uintah County	8,538	8,595	8,595	0.7	0.7
Moffat County	10,576	10,666	10,666	0.9	0.9
Rio Blanco County	10,378	10,506	10,506	1.2	1.2
Routt County	15,884	15,895	15,895	0.1	0.1

See Appendix 5 for data sources and analysis methods.

¹Income figures represented in thousands of dollars.

N/A = not applicable; the significance of population increase is measured for communities that have to provide the facilities and services.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-15
**EFFECTS TO LOCAL GOVERNMENT REVENUE FROM CONSTRUCTION
 AND OPERATION OF THE SAND WASH ALTERNATIVE**

County/School District	Baseline*	Sand Wash Alternative*	Interrelated Projects*	Percent above Baseline	
				Sand Wash Alternative	Cumulative
Impacts During Construction (1985)					
Lincoln County	\$ 5,353	\$ 18	\$ 628	0.3	12.1
Lincoln County School District 1	5,674	14	4	0.2	0.3
Sweetwater County	18,257	18	112	0.1	0.7
Sweetwater County School District 1	26,062	19	599	0.1	2.4
Sweetwater County School District 2	12,782	43	0	0.3	0.3
Moffat County	10,908	2	0	**	**
Moffat County School District	10,023	4	0	**	**
Rio Blanco County	5,219	**	0	**	**
Rio Blanco County School District 4	3,592	1	0	**	**
Impacts During Operation (1990)					
Lincoln County	\$ 13,968	\$ 2	\$ 579	**	4.2
Lincoln County School District 1	18,576	2	428	**	2.3
Sweetwater County	18,990	44	248	0.2	1.5
Sweetwater County School District 1	26,840	38	937	0.1	3.6
Sweetwater County School District 2	13,290	111	0	0.8	0.8
Moffat County	15,820	65	0	0.4	0.4
Moffat County School District	14,530	125	0	0.9	0.9
Rio Blanco County	6,680	3	0	**	**
Rio Blanco County School District 4	4,240	5	0	0.1	0.1

See Appendix 5 for data sources and analysis methods.

*Figures are represented in thousands of dollars.

**Less than \$500.

- 134 miles, pronghorn winter range MP 18-61 MP 63-67 MP 79-88 MP 95-131 MP 136-154 MP 180-199 MP 205-210 - 9 miles, mule deer fawning range MP 78-87
- 62 miles, mule deer severe winter range MP 37-48 MP 63-67 MP 78-87 MP 147-174 MP 200-211

SAND WASH ALTERNATIVE—WILDLIFE

- 35 miles, elk winter range	MP 67-93 MP 164-167 MP 169-174 MP 201-202
- 43 miles, sage grouse breeding/nesting habitat	MP 8-12 MP 18-22 MP 25-29 MP 32-37 MP 66-77 MP 123-127 MP 153-158 MP 181-183 MP 190-194
- approximately 44 miles, raptor habitat	MP 14-17 MP 22-27 MP 45-46 MP 47-50 MP 61-67 MP 103-105 MP 109 MP 116 MP 118-125 MP 135-137 MP 146-147 MP 152-153 MP 177-180 MP 184-187 MP 190 MP 197 MP 199 MP 200-202
- 51 miles, whitetail prairie dog colonies	MP 2-7 MP 14-15 MP 21-25 MP 116-118 MP 124-131 MP 143-144 MP 154-163 MP 165-166 MP 167-169 MP 179-180 MP 181-182 MP 183-184 MP 185-201

The pipeline would pass within 2 miles of at least 22 known sage grouse strutting grounds as shown on Maps A1-5 and A1-6.

DIRECT IMPACTS

Impacts from the Sand Wash Alternative would be similar to those identified for the Proposed Action except for magnitude. Refer to the Proposed Action, Wildlife section, for discussion of anticipated impacts and Table 2-16 for miles and acres of habitat that would be disturbed by this alternative. The alternative route would not cross any identified elk calving areas.

Federally listed species would be encountered by this alternative pipeline route in the same kinds of habitat as found on the Proposed Action route. The Yampa River is known to be inhabited only by adult Colorado squawfish and adult humpback chubs above and below the crossing at MP 152 (Miller and others 1982b).

TABLE 2-16
WILDLIFE HABITATS DISTURBED AND OCCUPIED BY THE SAND WASH ALTERNATIVE

Habitat	Miles	Acres ¹
Pronghorn²		
winter, year-round, fawning	20	240
winter, year-round	134	1,608
summer, fawning	15	180
Mule Deer²		
winter, year-round, fawning	9	108
winter, year-round	62	744
Elk²		
winter, year-round	35	420
Raptor		
close proximity to known nests	44	N/A
Sage Grouse		
lek and nesting habitat	43	516
Prairie Dog colonies		
	51	612

¹Acreage figures based on 12 acres disturbed per linear mile.

²Big game habitat uses (shown) may include more than one season or type of use. Further breakdowns are not available.

The Little Snake River at MP 152 has a large oxbow area where ducks, Canada geese, and bald eagles concentrate. The Yampa River, above and below the Sand Wash Alternative crossing, is known to contain adult Colorado squawfish and humpback chubs, both of which are endangered species. The Green River crossing (MP 38) is located in excellent trout habitat.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Direct impacts to federally listed threatened and endangered species from construction of this alternative would be the same as those noted in the Proposed Action section with the exception of magnitude. Approximately 612 acres of black-footed ferret habitat would be disturbed by this alternative.

The cumulative impacts would be the same as those identified for the Proposed Action.

SUMMARY OF IMPACTS

The impacts to wildlife from the Sand Wash Alternative would be similar to those identified for the Proposed Action.

Soils and Vegetation

AFFECTED ENVIRONMENT

The Sand Wash Alternative route would pass through the Central Deseritic Basin, Mountains, and Plateau MLRA. This MLRA has an average annual precipitation of 6 to 12 inches, including areas up to 16 inches, and an average frost-free season of 80 to 125 days (SCS 1981).

The Sand Wash Alternative would cross landscape and terrain similar to that along the Proposed Action route.

Soils. Soils along the proposed Sand Wash Alternative route are similar to those along the north and south portions of the Proposed Action route. The following generalized groups of soils would be affected:

- *Soils of the floodplains and terraces.* This group of soils occurs in two precipitation zones—areas with less than 9 inches of annual precipitation and areas with 10 to 16 inches.
- *Soils of the rolling uplands, high terraces, plateaus, mesas, and alluvial fans.* This group of soils occurs in two precipitation zones—areas with less than 9 inches of annual precipitation and areas with 10 to 16 inches.
- *Shallow and moderately deep, strongly sloping to steep soils and rock outcrop.* This soil group occurs in two precipitation zones—areas with less than 9 inches of annual precipitation and areas with 10 to 16 inches.
- *Moderately dark colored soils of the plateaus and sideslopes.* This group of soils has an annual precipitation of 12 to 16 inches.

- *Strongly saline and alkaline soils on terraces, fans, and sideslopes.* This soil group occurs in two precipitation zones—areas with average annual precipitation less than 9 inches and areas with 10 to 16 inches.

A brief description of the generalized soil groups is provided in Appendix 7, Reclamation and Erosion Control Analysis.

Revegetation would be difficult on many soils in the area. Intensive reclamation measures would be needed, especially in areas with less than 9 inches of annual precipitation and on the steeper sloping areas (15 percent and more) with shallow soils. Unfavorable soil properties, including rock fragments, thin surface layers, moderate to strong alkalinity and salinity, shallow depths, and soil piping are common in the area and would present problems for erosion control and revegetation. (See Appendix 7 for a discussion of unfavorable soil properties.) The most favorable areas for revegetation are the floodplains and terrace soils and the less-sloping plateau soils in the higher precipitation areas. Excavation would be difficult in areas of shallow soils underlain by hard bedrock (most commonly on crest slopes and ridges) and areas of rock outcrops. The lack of unconsolidated soil material in these areas would require more fill from outside sources to provide adequate bedding for pipeline construction.

Table 2-17 lists the location and extent of the larger areas of unfavorable soils and terrain most susceptible to impacts from project activities.

Vegetation. The Sand Wash Alternative would affect five major vegetation types: sagebrush-grass, pinyon-juniper, greasewood, wet meadow-riparian, and saltbush-shadscale. These types combine several vegetation communities and range sites and were identified to evaluate potential impacts and determine revegetation and regeneration potential.

See the Proposed Action, Vegetation section, for a brief description of the vegetation types, their uses, and importance.

Sensitive Plants. Sensitive plant species are known to occur near the Sand Wash Alternative route at the following locations: (1) near the Hells Canyon potential ACEC (MP 116 to 117), *Eriogonum acalus* and *Cryptantha caespitosa* are known to occur within 0.5 mile of the alternative right-of-way, (2) within the southeastern edge of the Lookout Mountain potential ACEC (MP 127.5 to 131.1), *Sphaeromeria capitata*, *Minuartia nuttallii*, and *Cryptantha caespitosa*, are known to occur; and (3) the eastern side of the Cross Mountain WSA near MP 156.0 and 165.0 where *Penstemon yampaensis* could occur.

SAND WASH ALTERNATIVE—SOILS AND VEGETATION

TABLE 2-17

*AREAS MOST SUSCEPTIBLE TO SOIL AND VEGETATION IMPACTS FROM THE
SAND WASH ALTERNATIVE*

Project Component	Location by Milepost	Extent in Miles	Sensitive Area Description and Comments			
			Precipitation Less Than 9 inches	Slopes (15% +)	Unfavorable Soils Properties ¹	Other
CO₂ Pipeline	0.-7.2	7.2	X			
	7.2-7.8	0.6	X	X	X	
	7.8-11.1	3.3	X			
	11.1-11.6	0.5	X	X	X	
	11.6-12.3	0.7	X			
	12.3-12.8	0.5	X	X	X	
	12.8-15.9	3.1	X			
	15.9-16.4	0.5	X	X	X	
	16.4-17.1	0.7	X			
	17.1-17.3	0.2	X	X	X	
	17.3-35.7	18.4	X			
	35.7-37.9	2.2	X	X	X	
	37.9-38.0	0.1	X			
	38.0-38.2	0.2				Green River Crossing
	38.2-38.5	0.3	X			
	38.5-38.8	0.3	X	X	X	
	38.8-39.4	0.6	X			
	39.4-39.6	0.2	X	X	X	
	39.6-39.7	0.1	X			
	39.7-40.4	0.7	X	X	X	
	40.4-40.9	0.5	X			
	40.9-41.2	0.3	X	X	X	
	41.2-47.3	6.1	X			
	47.3-49.5	2.2	X	X	X	
	49.5-50.5	1.0	X			
	50.5-50.8	0.3	X	X	X	
	50.8-65.6	14.8	X			
	67.4-67.7	0.3		X	X	
	76.7-76.9	0.2		X	X	
	82.0-83.5	1.5				McCort Canyon-Gap Creek
	86.5-87.1	0.6		X	X	
	89.3-89.6	0.3		X	X	
	91.6-92.1	0.5		X	X	
	94.9-95.2	0.3		X	X	
	96.6-97.0	0.4		X	X	
	97.7-97.8	0.1		X	X	
	98.2-108.6	11.4	X			
	108.6-190.0	0.4	X	X	X	
	109.0-112.7	3.7	X			
	112.7-113.0	0.3	X	X	X	
	113.0-114.1	1.1	X			
	114.1-114.4	0.3	X	X	X	
	114.4-116.5	2.1	X			
	116.5-116.7	0.2	X	X	X	
	116.7-118.2	1.5	X			

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-17 (Concluded)
**AREAS MOST SUSCEPTIBLE TO SOIL AND VEGETATION IMPACTS FROM THE
 SAND WASH ALTERNATIVE**

Project Component	Location by Milepost	Extent in Miles	Sensitive Area Description and Comments			
			Precipitation Less Than 9 inches	Slopes (15% +)	Unfavorable Soils Properties ¹	Other
	118.2-119.9	1.7	X	X	X	
	119.9-121.9	2.0	X			
	121.9-122.1	0.2	X	X	X	
	121.1-125.9	3.8	X			
	125.9-126.1	0.2	X	X	X	
	127.9-131.1	3.2	X			Vermillion Bluffs
	131.1-134.4	3.3	X			
	134.4-136.0	1.6	X	X	X	
	136.0-143.9	7.9	X			
	143.9-144.1	0.2	X	X	X	
	144.1-145.8	1.7	X			
	145.8-146.1	0.3	X	X	X	
	146.1-147.2	1.1	X			
	147.2-147.6	0.4	X	X	X	
	147.6-148.7	1.1	X			
	152.0-152.2	0.2				Little Snake River Crossing
	156.5-157.0	0.5		X	X	
	160.1-160.3	0.2				Yampa River Crossing
	160.9-161.1	0.2		X	X	
	172.1-172.3	0.2		X	X	
	174.4-174.9	0.5		X	X	
	175.7-176.1	0.4		X	X	
	177.4-177.9	0.5		X	X	
	181.7-182.2	0.5		X	X	
	184.6-185.3	0.7		X	X	
	191.8-192.1	0.7		X	X	
	201.1-201.3	0.2		X	X	
TOTAL:		124.3				
			(1,492 acres)			

Notes: Table prepared from soils-terrain analysis and orthophotograph interpretations. Milepost locations are approximate, based on general, preliminary pipeline right-of-way information.

¹Parameters for determining unfavorable soil properties are:

- shallow over bedrock less than 20 inches
- underlain by hard bedrock
- sand, loam sand and clay textured surface and subsoil layers
- containing more than 35 percent coarse fragments by volume, exceeding sizes of 3 inches in diameter
- permeability less than 0.6 inch per hour
- water table less than 72 inches
- soil reaction with pH value greater than 8.5, salinity more than 16 millimhos in the upper 40 inches.
- occupying slopes steeper than 15 percent.
- soil subject to piping These soils are most susceptible to impacts and have low reclamation potential.

SAND WASH ALTERNATIVE—SOILS AND VEGETATION

Key Issue Areas. The key issue areas determined to be most strongly affected by construction and operation of the Sand Wash Alternative are as follows.

- *McCort Canyon-Gap Creek* (Map A1-1). This area lies between MP 82 and 85.3 and is known locally as Titsworth Gap. It is a narrow gap where Beans Spring Creek joins Gap Creek. The area consists of a perennial stream with a narrow drainageway bordered by strongly sloping to steep sideslopes.

Springs occur in the area. (Iron Springs occurs within the right-of-way.) The area contains a county road and the Mountain Fuel pipeline.

- *Vermillion Bluffs* (Map A1-2). This area lies between MP 127.5 and 131.1 and is within the Lookout Mountain potential ACEC. Lookout Mountain (elevation 8,120 feet) and the adjoining *Vermillion Bluffs* form a prominent 1,700-foot-high escarpment. The bluffs are exposures of colorful geologic formations and were used as geologic type locations. The area has several sensitive plant species, rare plant communities, and high scenic values. The Sand Wash Alternative route would be located within the road right-of-way on the area's southeastern edge below the crest of the bluffs where the landscape blends with the dissected dendritic drainage pattern to the east. An unpaved road crosses the area.

DIRECT IMPACTS

The Sand Wash Alternative would disturb 2,535 acres of land, of which all but 3 acres would be reclaimed. The remaining 3 acres would be removed by the booster station for the life of the project and reclaimed after abandonment. Table 2-18 shows the estimated acreages of each vegetation type that would be disturbed by the Sand Wash Alternative and occupied by associated facilities.

Soil and vegetation impact potential would be similar to that identified for the Proposed Action. See the Proposed Action discussion for land disturbance and potential impacts to soils and vegetation.

Soils. The pipeline would disturb 1,492 acres of sensitive soils (Table 2-17). Soil impact potential would be greater in areas with less favorable soil and climatic conditions because the soils are more susceptible to erosion and piping hazards and have lower revegetation potential.

TABLE 2-18
ACRES OF VEGETATION TYPES DISTURBED AND OCCUPIED BY THE SAND WASH ALTERNATIVE

ACREAGE DISTURBED AND OCCUPIED			
Vegetation Types	Sand Wash Alternative	Interrelated Projects	Total
Sagebrush-Grass	1,675	640 (640)	2,315 (640)
Pinyon-Juniper	94	0	94
Greasewood	143	0	143
Saltbush-Shadscale	529(3)	0	529 (3)
Wet Meadow-Riparian	80	0	80
Cropland	14	0	14
TOTAL	2,535(3)	640 (640)	3,175 (640)

Sources: Salt Wells Oil and Gas EA (BLM 1981c); White River Grazing EIS (BLM 1980a); Salt Wells-Pilot Butte Grazing EIS (BLM 1983d); Little Snake URA (BLM 1980d); Riley Ridge Natural Gas Project EIS (BLM 1983a); Kemmerer URA (BLM 1982a); and Range Data and Interpretations of Orthophotographs.

Note: Figures enclosed by parentheses are acreages that would be removed (occupied for the life of the project). All disturbed acreage would be reclaimed. Acreage occupied would be reclaimed when the project was abandoned.

With the effective use of applicable erosion control and reclamation procedures outlined in Appendix 3, the loss of soil and reduction of soil productivity and stability would be minimal and allow for successful restoration to near preconstruction conditions. Therefore, impacts to soils would generally be insignificant. Some unquantifiable soil loss resulting from accelerated wind and water erosion would occur until erosion control measures are applied.

A few, small (less than 150 feet long), unquantifiable areas (mainly abrupt, steep slopes and small, localized areas with soils containing unfavorable physical and chemical properties) would be subject to accelerated erosion and require intensive and continuing follow-up

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

erosion control measures. Impacts to soils would be significant if applicable erosion control measures were not properly implemented, due to lack of compliance with approved plans and stipulations or if adverse weather conditions (mainly heavy rainstorms) occurred during construction before erosion control measures could be applied.

Vegetation. The estimated acreages of each vegetation type that would be disturbed by the Sand Wash Alternative and occupied by associated facilities are shown on Table 2-18. Understory vegetation (grasses and forbs) is expected to return to preconstruction densities within 5 years after construction. Overstory vegetation (shrubs and trees) would take longer periods of time to become established to near preconstruction conditions.

Pinyon-Juniper	50 to 75 years
Sagebrush types	10 to 25 years
Saltbush and greasewood	20 to 30 years
Mountain shrub types	20 to 40 years
Riparian vegetation (trees, shrubs, and bushes)	10 to 25 years

The significance of impacts and the acreage that would be affected would depend on how well the proposed reclamation program and measures outlined in Appendix 3 are implemented. Areas with lower restoration and revegetation potential that would be more susceptible to impacts are shown in Table 2-17. Significant impacts to vegetation could occur in the low precipitation zone (less than 9 inches annually). A greater risk of understory revegetation success requiring more than 5 years and the invasion of halogeton and other invader plants exceeding 10 percent of the plant cover could occur. However, the establishment of grass would be expected within 5 years with more intensive use of effective erosion control and revegetation measures.

Sensitive Plants. Sensitive plants would not be disturbed at the Hells Canyon potential ACEC and the Cross Mountain WSA. Pipeline alignment would follow the road right-of-way at the Lookout Mountain potential ACEC and not disturb sensitive plants within that area.

Key Issue Areas.

- *McCort Canyon-Gap Creek.* The pipeline route through this area would require careful alignment because of limited space, steep sideslopes, and narrow drainageway. Construction and operation of the pipeline in this area is not expected to contribute any significant impact to soils or vegetation with effective use of the erosion control and reclamation procedures outlined in Appendix 3.

- *Vermillion Bluffs.* The pipeline alignment would be located within the road right-of-way at the Lookout Mountain potential ACEC. Construction and operation of the pipeline would not disturb any sensitive plants or any part of the geologic formations (bluffs) within the area.

No cumulative impacts to soils and vegetation are expected.

SUMMARY OF IMPACTS

The Sand Wash Alternative would cause no significant impacts to soils. Soil loss and reduction of the soil productive capacity would be minimal due to the use of an effective erosion control, reclamation, and revegetation program as outlined in Appendix 3. Disturbed land would be restored to preconstruction conditions. Accelerated wind and water erosion would cause some unquantifiable soil loss until erosion control measures were implemented.

Impacts to vegetation would generally be insignificant. Grasses and forbs would return to near preconstruction densities within 5 years following construction with implementation of the erosion control, reclamation, and revegetation program outlined in Appendix 3. Significant impacts could occur in low precipitation zones (less than 9 inches annually) where more time may be needed to establish adequate understory vegetation and where halogeton and other invader plants could exceed 10 percent of the cover. Grass reestablishment, however, could still be expected within 5 years with more intensive use of effective erosion control and revegetation measures.

Water Resources

AFFECTED ENVIRONMENT

The Sand Wash Alternative would cross parts of the Green River Basin below the Fontenelle Reservoir in Wyoming and parts of the Little Snake and Yampa River drainages in Colorado. The pipeline would cross the Green River at MP 38 in Wyoming, the Little Snake River at MP 152 in Colorado, and the Yampa River at MP 160.5 in Colorado. It would also cross six perennial streams and many intermittent drainages and dry washes, and pass through Titsworth Gap which contains a road and a pipeline.

The Green River is regulated above the first crossing by the Fontenelle Reservoir. Its annual average flow at Green River, Utah is 3,122,000 acre-feet (4,309 cfs), and its sediment load ranges from 54 to 2,230,000 tons per day (9 to 40,600 mg/l). Total sediment load during the

SAND WASH ALTERNATIVE—AGRICULTURE

1980 water year was 10,281,496 tons. The flow of the Yampa River at Deer Lodge, upstream from the crossing, ranged from 23,400 to 179 cubic feet per second (cfs) during the 1983 water year. Its sediment load ranged from 3,340 to 330 mg/l. The highest flow of record for the Little Snake River at Lilly, downstream from the crossing, was 14,200 cfs in 1926, but the river goes dry in the late summer of most years. The maximum sediment load was 17,000 mg/l in 1981.

DIRECT IMPACTS

Pipeline construction and operation would have the following short-term direct impacts: increased erosion on steep slopes, increased sedimentation during construction across streams, and increased stream sedimentation from an improbable rupture of the pipeline beneath a stream during operation.

Because streams and drainages would be crossed during the dry period of the year, building the pipeline across intermittent streams or drainages should have no significant impacts. Crossing small perennial streams, such as Titsworth Gap, Salt Wells, North Fork Vermillion, Coyote, Vermillion, and Stinking Water creeks could result in short-term, localized suspended sediment loads. These loads, however, would be much smaller than naturally occurring sediment loads at other times of the year because of snow melt and thunderstorms.

Sediment concentrations produced by crossing the smaller rivers, the Little Snake and Yampa, are expected to be similar to those produced by the Proposed Action.

No cumulative impacts to water resources are expected.

SUMMARY OF IMPACTS

Construction and operation of the Sand Wash Alternative route would not significantly affect the quantity or quality of water resources because (1) no water would be consumed, (2) the potential sediment contributions would be minimized by required construction practices, and (3) no structures would be placed on floodplains that would impede flood flows.

Agriculture

AFFECTED ENVIRONMENT

Livestock Grazing. The Sand Wash Alternative would cross grazing lands with grazing capacities and management needs similar to the lands that would be crossed by the Proposed Action. (See the Proposed Action discussion on livestock grazing.) Grazing allotments affected

by this alternative are listed on Table 2-19. Ranching operations within the pipeline route include cow-calf, cow-calf-yearling, and sheep grazing.

Farming (Cropland). The Sand Wash Alternative would cross 0.3 mile of irrigated cropland (MP 152.2 to 152.5) and 0.8 mile of nonirrigated cropland (MP 164.4 to 165.2). Alfalfa hay, small grains (barley and oats), corn for silage, and meadow hay are grown on the irrigated cropland. Alfalfa is the main crop. Wheat is the most common crop grown on nonirrigated cropland. Fifty percent of the irrigated cropland is prime agricultural land, and most of the cropland is important cropland (SCS and BLM 1981). No cropland would be affected by any of the surface facilities.

DIRECT IMPACTS

Livestock Grazing. Pipeline construction would cause a loss of less than 1 percent of the available forage. This is less than the 5 percent significance criterion and would therefore be insignificant. Table 2-19 shows the potential loss of AUMs by allotment, number of operators affected, and the percentage of each allotment affected.

Farming (Cropland). Pipeline construction would disturb 4 acres of irrigated cropland and 10 acres of nonirrigated cropland for one growing season. Impacts to cropland from pipeline construction would be short term (1 year) and insignificant because erosion control and reclamation measures outlined in Appendix 3 would successfully restore and protect the cropland. No cropland would be converted to other uses.

CUMULATIVE IMPACTS

Livestock Grazing. Cumulatively, the Sand Wash Alternative and the Chevron Phosphate Project would affect the Granger, Rock Springs, Mellor Mountain, and Salt Wells grazing allotments. The cumulative impact would cause the loss of 315 AUMs of forage for 2 to 5 years and 67 AUMs of forage for the life of the interrelated projects. This loss of forage represents less than 1 percent of the available forage. This forage loss would be well below the 5 percent significance criterion and would be insignificant to individual livestock operations and to the livestock industry. Refer to Table 2-19 for the expected loss of AUMs by allotment, number of operators affected, and the percentage of allotment affected.

Farming (Cropland). No interrelated projects would affect cropland. Cumulative impacts would thus be the same as the direct impacts. No cropland would be converted to homesites and other urban uses from the

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-19
**GRAZING ALLOTMENTS AFFECTED AND GRAZING LOSSES CAUSED BY THE
 SAND WASH ALTERNATIVE**

		CURRENT STATUS				POTENTIAL GRAZING LOSSES (AUMS)				
State	Allotment Name (Number)	Number of Operations	Livestock Class ¹	Season of Use ²	Total and Active Preference ³	Sand Wash Alternative	Interrelated Projects	Cumulative		
								Total	Percent of Allotment	Additional Notes
Wyoming	Granger	8	C,S	Y	20,603 (16,587)	5	32	37	0.1	Large Allotment with Alternating Sections of Private and BLM-administered land
	Rock Springs (3018)		C,S,H	Y	213,106 (107,227)	49	152	301	0.1	
	Mellor Mountain (4027)		C,S	S-Su-F	9,162 (6,101)	7	2	9	0.1	
	Circle Springs (4001)		C,S	S-Su	1,460 (946)	1	0	1	0.1	
	Salt Wells (4009)		C,H	S-Su	4,568 (2,618)	3	2	5	0.2	
	Vermillion Creek (4003)		C,S	Y	15,060 (12,903)	13	0	13	0.1	
	Ann Mountain (4007)		C,S	Su-F-W	10,566 (8,600)	9	0	9	0.1	
Colorado	Crooked Wash (4005)		S	W-S	2,292 (2,292)	6	0	6	0.2	
	Hiawatha (4300)	1	S	W-S	(2,906)	5	0	5	0.15	
	Shell Creek (4301)	1	C	W-S	(520)	8	0	8	1.5	
	Lookout Draw (4216)	1	S,C	Y	(1,300)	21	0	21	1.6	
	Sand Wash (4219)	1	S,C	S-F-W	(7,540)	12	0	12	0.15	
	Cross Mountain (4307)	1	C,S	S-Su-F	(1,152)	5	0	5	0.4	
	Grounds (4222)	1	C	S-Su-F	(987)	3	0	3	0.3	
	Disappointment (4400)	3	C,S	Y	(3,120)	5	0	5	0.15	
	Elk Springs (6326)		S	S-W	(1,512)	10	0	10	0.6	
	Baking Powder (6331)		S	kW	(491)	4	0	4	0.8	
	Horse Draw (6332)		S	S-W	(1,269)	5	0	5	0.4	
	Massadona (6324)		S	S-W	(800)	5	0	5	0.6	
	Miller Creek (6371)	1	S	W	(202)	4	0	4	1.9	
	Rock Well Draw (6321)	1	S	Y	85 (43)	2	0	2	4.6	
	Artesia (6308)		S	W-S	5,208 (3,712)	3	0	3	0.1	
	Raven Park (6314)		S	S-W	(763)	8	0	8	1.0	

SAND WASH ALTERNATIVE—VISUAL RESOURCES

TABLE 2-19 (Concluded)
**GRAZING ALLOTMENTS AFFECTED AND GRAZING LOSSES CAUSED BY THE
 SAND WASH ALTERNATIVE**

State	CURRENT STATUS				POTENTIAL GRAZING LOSSES (AUMS)				
	Allotment Name (Number)	Number of Operations	Livestock Class ¹	Season of Use ²	Total and Active Preference ³	Sand Wash Alternative	Interrelated Projects	Cumulative	
								Total	Percent of Allotment
	Coal Oil (6313)	1	S	W	250 (164)	1	0	1	0.2
TOTAL:	24 Allotments	NA	NA	NA		104	188	382	N/A

Source: Livestock grazing and forage carrying capacity information presented in this table was gathered from the Salt Wells-Pilot Butte Grazing Draft EIS (BLM 1983d); the Draft Three Corners Grazing Management EIS (BLM 1979a); White River Resource Area Grazing Management Draft EIS (BLM 1980a); Big Sandy Salt Wells Oil and Gas EA (BLM 1981c); Ashley Creek (URA 1979); Little Snake URA (1980d) and communication with range conservationists at the Vernal, Craig, and Meeker BLM offices.

¹Class of Livestock: C = Cattle, S = Sheep, and H = Horses.

²Season of Use: S = Spring, Su = Summer, F = Fall, W = Winter, and Y = Yearlong.

³Active Preference AUM figure is included in parentheses.

predicted increased population at Rock Springs resulting from interrelated projects.

SUMMARY OF IMPACTS

Construction and operation of the Sand Wash Alternative would not significantly affect agriculture (livestock grazing and farming-cropland). Soil productivity would not be reduced and revegetation is expected to be successful with the effective use of applicable erosion control, reclamation, and revegetation measures.

The alternative route would cross 23 miles of VRM Class II areas generally occurring along the Green River and near the Cross Mountain-Yampa River area. These areas are generally the most visually sensitive and highly scenic portions of the project area. VRM Class III areas are associated with major and secondary highways and localized areas of high scenic quality and would be crossed by 79 miles of the route. The alternative would cross 109 miles of VRM Class IV areas. VRM Class IV areas are generally unseen by the public or have less diverse landscape features (BLM 1975, 1977b, 1979d, 1980a, 1983d).

DIRECT IMPACTS

Primary long-term impacts from the Sand Wash Alternative pipeline would be vegetative clearings, structural contrasts related to the booster station and associated power source and, to a lesser extent, modifications to landform. The microwave system would add antennas to existing mountaintop communication sites. Because these facilities would be placed at higher elevations in visually sensitive areas, they would tend to continue adding adverse geometric structures to the landscape. The SCADA terminals would add antennas, support buildings and fences, and power distribution lines to the landscape.

Visual Resources

AFFECTED ENVIRONMENT

The Sand Wash Alternative would occur within two of the three physiographic provinces described for the Proposed Action. The northern portion of the alternative would occur within the Wyoming Basin physiographic province. The southern portion of the route would enter the Colorado Plateaus physiographic province (Fenneman 1931).

The landscape in three of the four VRM classes would be affected by this alternative. Table 2-20 summarizes existing affected acres for each class by milepost and facility location. (Refer to Appendix 8 for definitions of VRM classes.)

Visual resource changes that would not meet the standards for the VRM class of the area in which they occur would be significant, adverse impacts. These impacts are described for the Sand Wash Alternative in Table 2-21.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 2-20
TOTAL MILES AND ACRES OF VISUAL RESOURCE MANAGEMENT CLASSES
AFFECTED BY THE SAND WASH ALTERNATIVE

Component and Location	Existing VRM Class ¹	Number of Miles Affected	Acres of VRM Class Affected
Pipeline			
MP 0-12	IV	12.0	144
MP 12-37.5	III	25.5	306
MP 37.5-41	II	3.5	42
MP 41-42	III	1.0	12
MP 42-44.5	IV	2.5	30
MP 44.5-64	III	19.5	234
MP 64-115.5	IV	51.5	618
MP 115.5-120	II	4.5	54
MP 120-122	IV	2.0	24
MP 122-124	III	2.0	24
MP 124-151	IV	27.0	324
MP 151-153.5	II	2.5	30
MP 153.5-162	IV	8.5	102
MP 162-174.5	II	12.5	150
MP 174.5-205.5	III	31.0	372
MP 205.5-211 (end)	IV	5.5	66
Booster Station	III	—	3
Microwave Stations²			
Wilkins Peak	III	—	0
Quaking Asp Mountain	IV	—	0
Lookout Mountain	IV	—	0
Juniper Mountain	III	—	0
Raven Ridge	III	—	0
SCADA Terminals³			
MP 38	II	3.0	7 ⁴
MP 52.5	III	0.5	1
MP 111	IV	1.0	2
MP 160	II	4.0	9
	IV	1.0	2

¹Refer to Appendix 8, Visual Resource Management Methodology, for definitions of terms.

²All microwave stations would involve adding new antennas to existing facilities; therefore, no new acres would be affected.

³SCADA terminals would be included within the pipeline right-of-way; therefore, the miles shown indicate the length of the power distribution line.

⁴Acreages are shown for the power distribution lines at 2.2 miles/acre for approximately a 20-foot width.

SAND WASH ALTERNATIVE—VISUAL RESOURCES

TABLE 2-21

LONG-TERM SIGNIFICANT ADVERSE VISUAL RESOURCE IMPACTS CAUSED BY THE SAND WASH ALTERNATIVE

Component and Location	Existing VRM Class ¹	Acres Significantly Affected	Primary Viewpoints	Impacts
Pipeline				
MP 37.5-38.5	II	12	Green River (Green River Crossing)	Contrasts in vegetative clearing for pipeline
MP 48-50.5	III	30	Interstate Highway 80	Contrasts in vegetative clearing for pipeline
MP 108.5-110	IV	18	State Highway 430 (Wyoming, Colorado)	Contrasts in vegetative clearing and possible landform modification for pipeline through rugged terrain of Vermillion Creek area
MP 117-119	II	24	County Road 4	Contrasts in vegetative clearing in Shell Creek area for pipeline construction along County Road 4
MP 151-153.5	II	30	State Highway 318	Contrasts in vegetative clearing for pipeline construction in Little Snake Valley
MP 153.5-155	IV	18	Northern portion of Cross Mountain WSA	Contrasts in vegetative clearing along pipeline alignment
MP 174-175	II	12	US Highway 40 and local residences	Contrasts in vegetative clearing from pipeline construction through a visually sensitive and confined landscape (Elk Springs area)
Booster Station	III	3	Interstate 80 and Green River as middleground and from US Highway 191 as foreground/middleground	Contrasts in addition of structures (booster station and power distribution line)
Microwave Stations²				
Wilkins Peak	III	0	US Highway 191	Additional cumulative structural contrast of existing antennas and building
Quaking Asp Mtn.	IV	0	US Highway 191	Additional cumulative structural contrast of existing antennas and building
Lookout Mountain	IV	0	County Road 67	Additional cumulative structural contrast of antennas and building currently being constructed
Juniper Mountain	III	0	US Highway 40 and local communities	Additional cumulative structural contrast of existing antennas and building
Raven Ridge	III	0	US Highway 40 and Rangely	Additional cumulative structural contrast of existing antennas and building
SCADA Terminals³				
MP 38	II	7 ³	Green River	Structural contrasts from the addition of terminals and distribution lines
MP 111	IV	2	State Highway 430	Structural contrasts from the addition of terminals and distribution lines
MP 160	II	9	Cross Mountain WSA, Yampa River and	Structural contrasts from the addition of terminals and distribution lines
	IV	2	US Highway 40	

¹Refer to Appendix 8, Visual Resource Management Methodology, for definitions of terms.

²All microwave stations would involve adding new antennas to existing facilities; therefore, no new acres would be affected.

³Acres would be significantly affected by the addition of the power distribution lines. The SCADA terminal facilities would be included within the pipeline right-of-way.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

CUMULATIVE IMPACTS

The cumulative visual resource impacts of building the Sand Wash Alternative pipeline along existing pipelines and in conjunction with the proposed Chevron Phosphate Project can only be subjectively analyzed. The visual resource impacts of building the Sand Wash Alternative pipeline along existing pipeline rights-of-way are described in the Proposed Action analysis. Impacts of building the alternative alongside the Chevron Phosphate Project would be slight because in only a few instances would the rights-of-way parallel or cross for short distances. In all cases, the cumulative impacts would be insignificant.

SUMMARY OF IMPACTS

The Sand Wash Alternative would significantly affect 94 acres in VRM Class II areas, 33 acres in VRM Class III areas, and 40 acres in VRM Class IV areas. The modifications would not meet the standards of the VRM classes for the areas where the project would be located. The main cause of visual resource impacts would be vegetative clearings for the pipeline. Other impacts would be the building of facilities, such as the booster station, power distribution line, the antennas that would be added to existing microwave stations, and the SCADA terminal facilities and distribution lines. Only under a few conditions would landform modification from pipeline construction create significant visual resource impacts.

Cultural Resources

AFFECTED ENVIRONMENT

Cultural resources for portions of the Sand Wash Alternative route in Wyoming have been previously surveyed for the MAPCO natural gas pipeline (Collins and others 1980), the Trailblazer natural gas pipeline (BLM 1981e), and the Mountain Fuel Supply Company survey (Lindsey 1977). Most sites in Wyoming are lithic scatters and campsites of undetermined age that are either ineligible for listing on the National Register of Historic Places or have not been evaluated. Significant sites within the 1-mile-wide corridor include the Pony Express Trail, the Oregon and Mormon Pioneer National Historic Trails, the Bryan-South Pass City Historic Trail, the Green River-South Pass Stage Road, the Overland Trail, the Cherokee Trail, and the Rock Springs-Browns Park stage road. These sites are either listed on the National Register of Historic Places or have been determined eligible for listing.

The Colorado portion of this route has had relatively few cultural resource inventories. A Class III cultural survey was conducted along the crossing of the alternative route with Shell Creek (Laboratory of Public Archaeology 1974; Head 1984), and a Class II cultural survey south of Lookout Mountain in the Sand Wash area found 25 sites (Stucky 1977). Recent seismographic tests for oil and gas potential in the Sand Wash area have found 66 sites (Hoefer and Thompson 1984). Cultural survey work was completed in 1981 for the proposed Juniper-Cross Mountain Reservoir area (Chase 1981). The Lookout Mountain and Skull Creek Basin areas are thought to have a high potential for cultural sites. Cultural surveys in northwest Colorado found predominantly prehistoric lithic scatters, isolated finds, open camps, and a high density of Fremont-influenced cultural sites, such as pit houses, granaries, cultivated fields, and other prehistoric features (Powers Elevation Company 1980; Laboratory of Public Archaeology 1974; Grand River Institute 1980; and Nickens and Associates 1981).

Over 106 known cultural sites have been found within a 1-mile-wide corridor for the Sand Wash Alternative (62 sites in Wyoming and 44 sites in Colorado). Much of the alternative route, however, has not had any survey work, especially the Wyoming portion, which indicates that many more cultural sites could occur along the route.

The microwave repeater sites would be located on Juniper Mountain, Aspen Mountain, Wilkens Peak, Lookout Mountain, and Raven Ridge. Since the mountain sites have already been disturbed, the likelihood of finding any significant, intact cultural resource sites would be small. Survey requirements described in Appendix 3 would apply to terminal and mountaintop microwave repeater sites.

DIRECT IMPACTS

Construction of the Sand Wash Alternative would affect cultural resources much as would construction along the Proposed Action route. In areas of constricted topography (Titsworth Gap, *Vermillion Bluffs*, and Buffalo Gap), cultural sites may be difficult to avoid during construction. With the intensive use of the cultural surveys and compliance procedures described in Appendix 3, significant cultural resource impacts (either direct or cumulative) should not occur.

SUMMARY OF IMPACTS

Significant cultural resource impacts should not occur with intensive use of the cultural surveys and compliance

procedures described in Appendix 3. Because the exact locations of pipeline facilities and ancillary facilities are unknown for any of the Sand Wash Alternative components, specific impacts cannot be predicted, even for known cultural sites.

Recreation Resources

AFFECTED ENVIRONMENT

The Sand Wash Alternative would cross the Green River once at MP 38. The Green River, as stated in the Proposed Action section, provides important recreation opportunities for fishing, floatboating, and dispersed camping. Fishing usually occurs with floatboating along the Green River. The alternative pipeline route would also cross the Yampa River at MP 160.5 and parallel Moffat County Road 85. Hunting opportunities would be the same as described for the Proposed Action.

DIRECT IMPACTS

The road to and the pipeline crossing at MP 160.5 could become a take-out or put-in point for kayakers or for fishermen and hunters recreating along the Yampa River. Additionally, the construction work crew might camp within the Deerlodge Park Campground and displace some visitors to Dinosaur National Monument for 1 to 2 weeks.

All other impacts from this alternative would be similar to those analyzed for the Proposed Action route and considered insignificant. The cumulative impacts would be same as the direct impacts.

SUMMARY OF IMPACTS

Impacts to dispersed recreation opportunities would be insignificant since they would be short term, temporary, and in an area where many recreation opportunities exist.

Wilderness

AFFECTED ENVIRONMENT

The following WSAs are located along or near the Sand Wash Alternative (Map A1-2): Cross Mountain (CO-010-230), Skull Creek (CO-010-003), and Willow Creek (CO-010-002). BLM is developing the Little Snake Resource Management Plan EIS, to be released in April or May 1985, which will analyze the Cross Mountain WSA.

The Skull Creek WSA (CO-010-003) is located 15 miles northeast of Rangely, Colorado. The *White River Resource Area Wilderness Planning Amendments Draft EIS* (BLM 1983b) gives a detailed description of the area.

The Willow Creek WSA (CO-010-002) is located 10 miles north of Rangely, Colorado. The *White River Resource Area Wilderness Planning Amendments Draft EIS* (BLM 1983b) also covers this area.

DIRECT IMPACTS

Implementing the Sand Wash Alternative would not significantly affect wilderness, since no project-related components would cross any WSA. Indirect impacts of pipeline construction (noise and dust) might briefly (1 to 2 weeks) affect wilderness values. Under the BLM "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands," sights and sounds of human activities and work outside the boundaries of the wilderness study area may be considered in assessing the quality of an area's naturalness or its opportunities for solitude or primitive recreation. (*Federal Register* 1983d). Part of the proposed 5-mile-long, 220 volt power distribution line leading to the SCADA terminal at the Yampa River crossing would be noticeable to wilderness users of the adjacent Cross Mountain WSA, thereby diminishing the quality of solitude experiences. This would be a significant, long-term, indirect impact based on the significance criterion. (Refer to the Visual Resources section for additional analyses.) No permanent change to any wilderness-related values would occur to either the Skull Creek or Willow Creek WSAs; therefore, impacts to these WSAs could be insignificant.

The Sand Wash Alternative is not expected to have any significant, cumulative impacts on wilderness resources.

SUMMARY OF IMPACTS

Direct impacts to wilderness from the Sand Wash Alternative would be short term, temporary, and insignificant. Some minor noise intrusions and dust migration along the border of Cross Mountain, Skull Creek, and Willow Creek WSAs could degrade the quality of some wilderness experiences and cause wildlife to temporarily (1 to 2 weeks) migrate from the area.

The power distribution lines, as seen from the Cross Mountain WSA, would create a significant, long-term impact to the wilderness values of that WSA.

Transportation Networks

AFFECTED ENVIRONMENT

The main area of influence for transportation networks include existing networks (road, rail, pipeline, or air) that would be disrupted by the Sand Wash Alternative route in Lincoln and Sweetwater counties, Wyoming; Uintah County, Utah; and Moffat and Rio Blanco counties, Colorado.

The roadways affected by the Sand Wash Alternative are mainly used for through-traffic movement and access between the few existing population centers of Green River, Rock Springs, Vernal, Craig, Meeker, and Rangely.

The roadways associated with the Sand Wash Alternative include an interstate highway, primary and secondary paved roads, and gravel and primitive dirt roads. The major highways are Interstate Highway 80, Wyoming State Highway 372; US Highways 191 and 40; Moffat County Roads 4, 67, 1R6, and 85; Rio Blanco County Road 1; Colorado State Highway 318; and other county and dirt roads that would provide access off the major roadways to the proposed pipeline right-of-way.

The WDOT reports low AADT accident rates and accidents for the project-related roadway segments of Wyoming State Highway 318 and US Highway 191. The UDOT reports that US Highway 40 has a heavy year-round traffic volume with annual average truck traffic (AATT) exceeding 20 percent of the traffic volume. The CDOT reports that Colorado State Highway 318 has low AADT, accident rate, and accidents and that US Highway 40 has a little above average AADT, accident rate, and accidents between Elk Springs and the Blue Mountain turn-off. July and August are the two peak volume months due to increased tourist traffic.

The Sand Wash Alternative route would parallel existing roads or existing or proposed pipelines for 192.5 miles or 91 percent of its length. These existing facilities include Wyoming State Highway 376 from MP 13 to 38; the Trailblazer natural gas pipeline from MP 38 to 52; the Mountain Fuel pipeline from MP 52 to 59; the MAPCO liquid hydrocarbon pipeline from MP 59 to 63; dirt roads from MP 63 to 71; the Mountain Fuel pipeline from MP 71 to 122; dirt roads from MP 122 to 165, except for a 5.5-mile-long stretch; and the Amoco pipeline from MP 165 to 211.

The road access south of Moffat County Road 4 from MP 122 to 165 is used mostly by trucks servicing the oil and gas field in the area. The road surfaces are gravel and dirt.

DIRECT IMPACTS

Transportation impacts are directly related to vehicle trips needed to carry workers, equipment, and supplies to construction sites. The following number of workers would need to be carried daily to the three construction spreads: Spread I, 155 workers, MP 0 to 80; Spread II, 124 workers, MP 80 to 140; and Spread III, 155 workers, MP 140 to 211. All three pipeline segments would be constructed simultaneously. Twenty-six trucks per day would carry pipe and equipment from the rail-head at the Rock Springs storage yard to construction sites and 20 trucks per day would carry pipe and equipment from the Craig storage yard to construction sites. For the entire project, 25,000 tons would be hauled from Rock Springs, and 21,000 tons would be hauled from Craig.

Increases in traffic flow would occur on segments of Wyoming State Highways 372 and 430; Colorado State Highway 318; US Highways 191 and 40; Moffat County Roads 4, 67, 85, and 1R6; and Rio Blanco County Road 1. Impacts from these increases would be similar to those identified for the Proposed Action. No roads would be blocked for longer than 15 minutes during construction.

No cumulative impacts to transportation would result from the Sand Wash Alternative.

SUMMARY OF IMPACTS

Impacts from the Sand Wash Alternative would be similar to those identified for the Proposed Action, except that no roads would be blocked for longer than 15 minutes during construction.

Land Use Constraints and Conflicts

AFFECTED ENVIRONMENT

The Sand Wash Alternative would cross trona lease areas from MP 22 to 30.5, various oil and gas leases, and the Bean Springs Coal Preferences Right Lease Area (PRLA) from MP 84.6 to 87.5 near Titsworth Gap. This area is currently under consideration for leasing.

DIRECT IMPACTS

Potential impacts from crossing trona and oil and gas lease areas would be the same as for the Proposed Action. In addition, the Sand Wash Alternative, in crossing the Bean Springs Coal PRLA (MP 84.6 to 87.5)

NO-ACTION ALTERNATIVE

could create potential interference with future mining operations. A pipeline could be in the way of excavations if the area is ever mined for coal. Coordination between the coal company and the pipeline company would be required.

SUMMARY OF IMPACTS

The Sand Wash Alternative could cause similar conflicts to oil and gas and trona leases as the Proposed Action.

The Sand Wash Alternative could cause potential interference with future mining operations if the Bean Springs Coal PRLA is leased and developed.

NO-ACTION ALTERNATIVE

Description

Because alternative sources of CO₂ exist at Cortez, Colorado and in Utah, disapproval of the Proposed Action would not necessarily preclude the transporting of CO₂ to Rangely. Beneficial impacts from the additional oil production and related socioeconomic benefits would also not necessarily be foregone.

If the No-Action Alternative was selected, Chevron would probably renegotiate a contract with Shell Pipeline Corporation (Shell) to supply CO₂ from Cortez. This could cause delays in the construction of the pipeline or increases in the prices of CO₂. Ultimately, the CO₂ injection program could be implemented. The impacts, then, of the No Action Alternative would likely be those from building the CO₂ pipeline from Cortez to Rangely, Colorado. Impacts associated with the Proposed Action would not occur except for the socioeconomic impacts resulting from the Rangely Weber Sand Unit continuing in operation. The following summary has been excerpted from the *McElmo to Rangely CO₂ Pipeline draft EIS*, currently in preparation.

Summary

The McElmo to Rangely CO₂ Pipeline, proposed by Shell, would originate at Shell's CO₂ field near Cortez, Colorado and terminate near Rangely, Colorado. The pipeline would be routed northwest of Cortez into Utah and then would travel north through La Sal Junction, Moab, and Crescent Junction, Utah. From there, the pipeline would travel northeast into Colorado, over Baxter Pass, and then north to Rangely.

Socioeconomic impacts from the proposal would be beneficial, including an increase in income flows, temporary employment of 300 to 400 workers, and increased tax revenues for the counties that the pipeline passed through.

Construction of the pipeline would result in the loss of habitat and disturbance to big game animals and raptors. Antelope, mule deer, and elk would all be affected with the greatest impact occurring if habitat was disturbed during critical winter or spring fawning periods. Construction and disturbance during the nesting season would likely result in the loss of golden eagles, prairie falcons, ferruginous hawks, and red-tailed hawks. If disturbance at the Colorado River crossing occurred during the nesting season, a great blue heron rookery would be disrupted and production likely lost for the year.

Short-term increases in suspended sediment (1 week) would occur from construction at the White and Colorado River crossings. Sediment from construction would temporarily affect fish and invertebrate populations in the Colorado and White rivers downstream from the crossings. Endangered species could be affected by pipeline construction. Wintering bald eagle, Colorado squawfish, and humpback chubs could all be potentially affected by human activity and the slight, short-term increased sediment load from construction at the crossings of the Colorado and White rivers. The razorback sucker, a U.S. Fish and Wildlife Service Category 2 species, could also be affected by the Colorado River crossing.

Whitetail prairie dogs occur in two areas: from Crescent Junction to the Utah-Colorado state line, and from south of Rangely to the pipeline terminus. Thus, the potential exists for impacts to the black-footed ferret.

Construction would temporarily disturb 2,724 acres of soils and vegetation, which would be rehabilitated within 5 years after construction. Two U.S. Fish and Wildlife Service Category 1 plants and six Category 2 plants, plus ten BLM-Colorado designated sensitive plants could potentially be affected.

Construction along the I-70 Alternative would affect visual resources and Utah State Highway 163 because most of the large number of travelers along these highways are recreationists. Moab Canyon and the Colorado and White rivers would also sustain significant visual resource impacts. Long-term impacts would occur to areas where cliffs or steep hillsides are encountered, especially Hole in the Rock, Moab Canyon, and Baxter Pass. Pipeline construction could potentially disrupt the WSA boundary along the Baxter Pass Road.

BENEFITS AND TRADE-OFFS

A small portion of the pipeline route would cross an active landslide area in the vicinity of Baxter Pass. Unless special construction techniques and routing were used, pipeline ruptures could occur.

Impacts to air quality, noise levels, transportation networks, cultural resources, paleontological resources, mineral resources, land uses, livestock, and agriculture would be insignificant.

BENEFITS, TRADE-OFFS, AND COMMITMENT OF RESOURCES

The impact analysis contained in this chapter considered the general measures stated in Appendix 3. No new mitigation measures were proposed or committed to; therefore, the unavoidable adverse impacts for each resource have already been discussed. This section focuses only on the benefits, trade-offs, and the commitment of resources from construction and operation of the Proposed Action or Sand Wash Alternative.

Benefits

The major benefit of the Proposed Action and the Sand Wash Alternative would be to extend oil production from the Rangely Unit oil field by an average of 4 million barrels per year for a 24-year period. If the Proposed Action route was selected, annual property taxes for 9 counties would increase by \$325,000 (Table 2-2); if the Sand Wash Alternative was selected, the annual property taxes for 11 counties would increase by \$400,000 (Table 2-15). The additional oil production from either the Proposed Action or the Sand Wash Alternative would generate annual revenues from property taxes, severance taxes, and federal royalties amounting to \$18 million. Project construction would generate direct employment opportunities for 520 to 555 workers and indirect (service and support personnel) employment for 155 to 175 workers. Construction would also generate \$15 million to \$16 million in personal income.

Constructing the Proposed Action along with the Chevron Phosphate Project pipeline would assist the county in the construction of an improved county road through Jesse Ewing Canyon. The project would also reduce the amount of CO₂ vented into the atmosphere by the La Barge gas plant (BLM 1983a).

Trade-Offs

The proposed project by itself would not adversely affect local areas, but the cumulative impact of the project with interrelated projects in the area would require Rock Springs to add workers. Project construction would degrade visual resources along the pipelines; some visual impacts would last for the life of the project or longer. Construction would also generate more traffic, which could increase accidents and loss of life. Construction would cause a short-term loss of wildlife habitat but no significant loss of animals.

Commitment of Resources

Construction and operation of the Proposed Action or Sand Wash Alternative routes could result in the irreversible or ir retrievable commitments of certain environmental or energy resources. An irreversible commitment of a resource cannot be changed once it occurs; an ir retrievable commitment of a resource cannot be recovered or reused. Other resources may be adversely affected only for the short term.

For this project, long term is defined as the 30-year life of the project or longer. Through the life of the project, neither the Proposed Action nor the Sand Wash Alternative would decrease the long-term productivity of the environment or resources affected by pipeline construction, other than by consuming energy.

Table 2-22 summarizes the long-term and short-term effects of the Proposed Action or Sand Wash Alternative to the various resources and indicates whether the resources would be irreversibly or irretrievably affected.

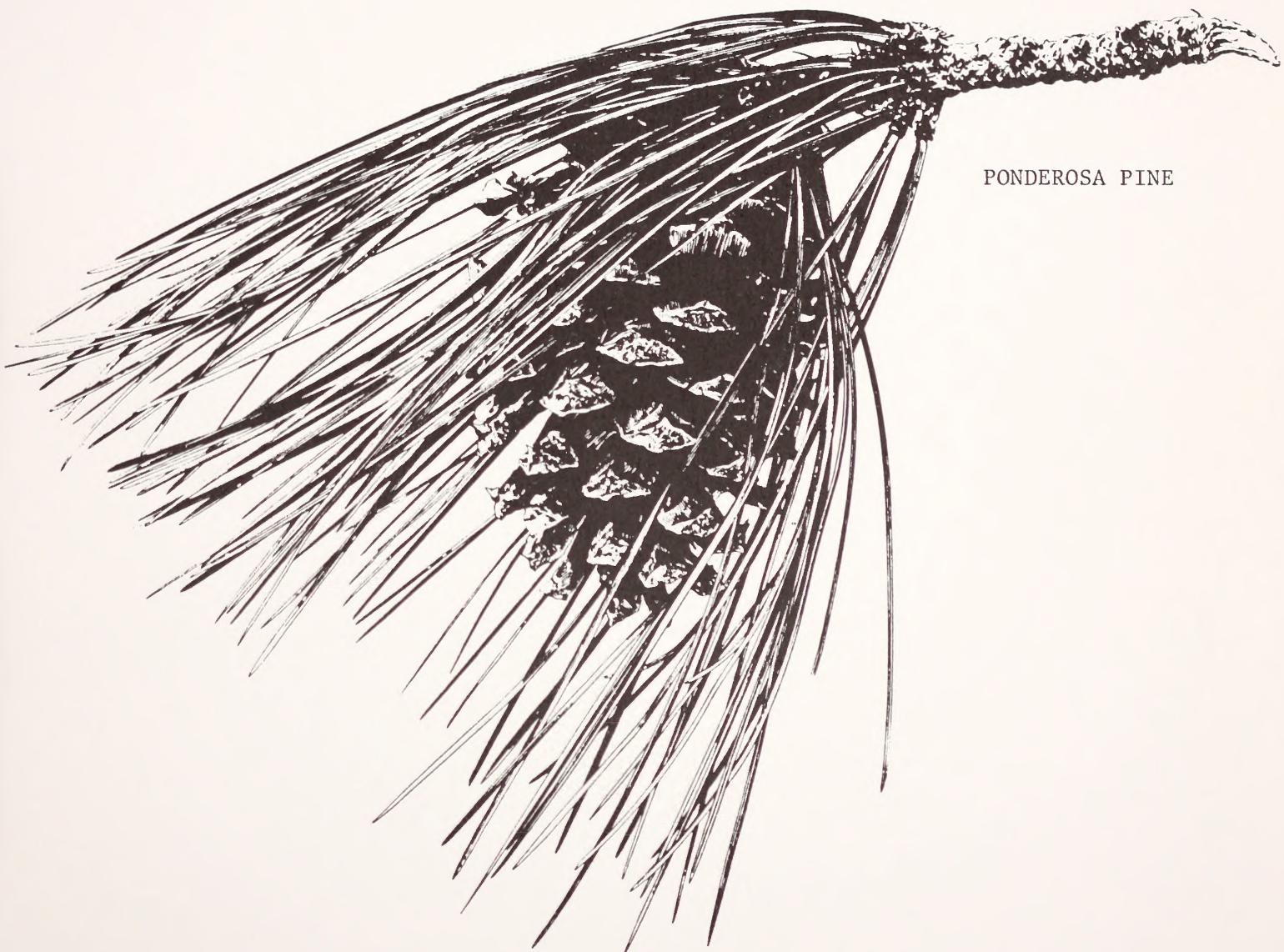
COMMITMENT OF RESOURCES

*TABLE 2-22
SHORT-TERM AND LONG-TERM IMPACTS RESULTING FROM THE
PROPOSED ACTION OR SAND WASH ALTERNATIVE*

Resource	Irreversible Impacts	Irrecoverable Impacts	Short-Term	Long-Term
Socioeconomics	No	No	Yes	Yes
Wildlife	No	No	Yes	No
Soils and Vegetation	No	No	Yes	No
Water Resources	No	No	Yes	No
Agriculture	No	No	Yes	No
Visual Resources	No	Yes	Yes	Yes
Cultural Resources	Yes	Yes	Yes	Yes
Recreation Resources	No	No	Yes	No
Wilderness	No	No	Yes	Yes
Transportation Networks	Yes	Yes	Yes	No
Air Quality	No	No	Yes	No

Chapter 3

Energy Efficiency and Comparative Analysis



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CHAPTER 3

ENERGY EFFICIENCY AND COMPARATIVE ANALYSIS

The energy efficiencies and environmental impacts of the Proposed Action and Sand Wash Alternative are compared in this chapter and in Table 3-1. The comparative analysis was developed using information included in Chapter 2. Since impacts to air quality, federally listed threatened and endangered plant species, sole sources of drinking water, prime and unique farmland, geological resources, and health and safety from either the Proposed Action or the Sand Wash Alternative would be similar for both routes as well as insignificant, these resources are not compared in this chapter.

ENERGY EFFICIENCY

Carbon dioxide would enter the pipeline at Exxon's La Barge gas plant at 2,200 to 2,700 pounds per square inch (psi) for both the Proposed Action and the Sand Wash Alternative. Four 10,000 horsepower electric motors would drive the compressors to the appropriate psi level. The field booster station at Rangely would recompress the gas back up to 3,000 psi from either route. Consequently the only difference in energy needs between the Proposed Action and the Sand Wash Alternative, which is 20 percent longer, is that the Sand Wash Alternative would need a booster station at Rock Springs. This booster station would house two 1,000-horsepower pumps: one to be used for operation and the other, as a backup. The Proposed Action would use 136,520,000 British thermal units (Btu's) per hour, and the Sand Wash Alternative would require 139,933,000 Btu's per hour or only 2.5 percent more.

COMPARATIVE ANALYSIS

Socioeconomics

Neither the Proposed Action nor the Sand Wash Alternative would significantly affect socioeconomics. The only differences are that if the Sand Wash Alternative was implemented, Rock Springs would gain 90 more people, Rangely would gain 5 more, and total personal income in Sweetwater County would increase by \$1,820,000 more than if the Proposed Action was implemented.

If the No-Action Alternative was implemented, these effects would not occur, and the Rangely Weber Sand Unit oil field would have to close down sooner. Rangely would experience a population loss of up to 530 (15 percent) by 2000 and a loss of goods and services of an equivalent level.

Wildlife

The Proposed Action would disturb 120 more acres of pronghorn winter/year-round/fawning habitat than the Sand Wash Alternative. However, the Sand Wash Alternative would disturb 924 more acres of pronghorn winter/year-round habitat and 60 more acres of summer/fawning habitat than the Proposed Action.

The Proposed Action would disturb 132 more acres of mule deer winter/year-round/fawning habitat than the Sand Wash Alternative, but the Sand Wash Alternative would disturb 72 more acres of mule deer winter/year-round habitat than the Proposed Action.

The Proposed Action would disturb 48 acres of elk winter/year-round/calving habitat while the Sand Wash Alternative would not disturb any. The Proposed Action would disturb 192 more acres of elk winter/year-round habitat than the Sand Wash Alternative.

The Sand Wash Alternative would pass near 11 more known raptor nests than the Proposed Action, and would disturb 24 more acres of sage grouse *leks* and nesting habitat than the Proposed Action. The alternative would also disturb 264 more acres of prairie dog habitat than the Proposed Action.

Neither the Proposed Action nor the Sand Wash Alternative would significantly affect either game fish or the endangered Colorado squawfish and humpback chub.

Soils and Vegetation

The Sand Wash Alternative would temporarily disturb 537 more acres of soils than the Proposed Action, and 378 more acres of soils which contain unfavorable physical and chemical properties and could require intensive and continuing erosion control measures.

Editor's Note: Words or phrases enclosed by asterisks are defined in the Glossary.

ENERGY EFFICIENCY—COMPARATIVE ANALYSIS

*TABLE 3-1
COMPARATIVE ANALYSIS*

Element	Proposed Action	Sand Wash Alternative*
TOTAL LENGTH OF PIPELINES—Miles	176	211 (+ 35)
ENERGY USE—Btu's/Hour	136,520,000	139,933,000 (+ 3,413,000)
SOCIOECONOMICS		
Population increase		
Rock Springs	270	360 (+ 90)
Rangely	40	45 (+ 5)
Total Personal Income (\$000)		
Sweetwater County	\$7,860	\$9,680 (+ \$1,820)
Local Government Revenue (\$000)		
Lincoln County	18	18 (0)
Rio Blanco County	1,527	1,527 (0)
Rangely	180	180 (0)
Rio Blanco County School District 4	1,329	1,329 (0)
WILDLIFE		
Pronghorn Habitat Disturbance—Acres		
Winter, year-round fawning	360	240 (- 240)
Winter, year-round	684	1,608 (+ 924)
Summer, fawning	120	180 (+ 60)
Mule Deer Habitat Disturbance—Acres		
Winter, year-round, fawning	240	108 (- 132)
Winter, year-round	672	744 (+ 72)
Elk Habitat Disturbance—Acres		
Winter, year-round, fawning	48	0 (- 48)
Winter, year-round	612	420 (- 196)
Raptors		
Close proximity to known nests	near 38 nests	near 44 nests (+ 11)
Sage grouse Habitat Disturbance—Acres		
lek and nesting habitat	492	516 (+ 24)
Prairie Dog Habitat Disturbance—Acres		
Colonies	348	612 (+ 264)
Fisheries		
Colorado Squawfish (Endangered Species)	No Impact	No Impact
Humpback Chub (Endangered Species)	No Impact	No Impact
SOILS AND VEGETATION		
Acres Soils Disturbed (1 year) and		
Acres Vegetation Disturbed (2-5 years)	1,992	2,535 (+ 543)
Acres Removed/Soils and Vegetation (30 years)	0	3 (+ 3)
Acres of "Sensitive Areas"**	1,114	1,492 (+ 378)
WATER RESOURCES		
Stream Crossings		
Green River	3	1 (- 2)
Yampa River	0	1 (+ 1)
Little Snake River	0	1 (+ 1)
Perennial Streams	2	6 (+ 4)

COMPARATIVE ANALYSIS

TABLE 3-1—(Continued)
COMPARATIVE ANALYSIS

Element	Proposed Action	Sand Wash Alternative*
Areas Critical to Watershed Management		
Red Creek Basin Escarpment	1	N/A
Richards Gap	1	N/A
Jesse Ewing Canyon	1	N/A
McCourt Canyon -Gap Creek	N/A	1
AGRICULTURE		
Grazing Loss—AUM/2-5 years	136	194 (+ 53)
Grazing Allotments—Number Affected	27	24 (- 3)
Cropland Loss—Acres/1 Year	11	14 (+ 3)
VISUAL RESOURCES**		
Acres Significantly Affected		
VRM Class II	120	94 (- 26)
VRM Class III	40	33 (- 7)
VRM Class IV	0	40 (+ 40)
VRM Class V	0	0 (- 5.5)
CULTURAL RESOURCES		
Number of Known Cultural Sites within a 1-Mile-Wide Corridor along the Pipeline	120	106 (- 14)
RECREATION		
Impacts to Recreation Resources and Quality of Recreation Experiences		
	Impacts to river running experiences on the Green River would be temporary (portions of 7 days) during pipeline construction. Dispersed recreation demand generally would increase insignificantly in 1985 during construction.	Dispersed recreation demand generally would increase insignificantly in 1985 during construction.
WILDERNESS		
Wilderness Study Areas Temporarily Affected	Red Creek Badlands	Skull Creek Willow Creek
Wilderness Study Areas Permanently Affected	None	Cross Mountain
TRANSPORTATION NETWORKS		
Significant Interference to:		
Roads		
Change in Traffic Flow Conditions		
FEDERAL	None	None
STATE	localized significance-short term	insignificant-short-term
COUNTY	localized significance-short term	insignificant-short term
PRIVATE	localized significance-short term	insignificant-short term
Change in Physical Conditions		
FEDERAL	None	None
STATE	None	None
COUNTY	insignificant-short term	insignificant-short term
PRIVATE	significant-short term	significant-short term

ENERGY EFFICIENCY—COMPARATIVE ANALYSIS

TABLE 3-1—(Concluded)
COMPARATIVE ANALYSIS

Element	Proposed Action	Sand Wash Alternative*
Traffic Delay		
JESSE EWING CANYON	significant-short term	N/A
BROWNS PARK	significant-short term	N/A
UTAH STATE		
HIGHWAY 149	significant-short term	N/A
Traffic Volume—Road Accidents		
FEDERAL	normal	normal
STATE	small increase-short term	small increase-short term
COUNTY	small increase-short term	small increase-short term
PRIVATE	small increase-short term	small increase-short term
Pipelines		
Conflicts With Existing Pipelines	unlikely but significant	unlikely but significant
PALEONTOLOGICAL RESOURCES		
Known Sites Where Paleontological Resources have been Found	One	None
LAND USE CONSTRAINTS AND CONFLICTS		
Crossings of Designated Minerals Areas		
Oil and Gas Leases	Yes	Yes
Trona Leases	Yes	Yes
Coal Leases	No	Yes

Note: MFPs = Management Framework Plans; AUM = animal unit month; mg/l = milligrams per liter; (\$000) = thousands of dollars; N/A = not applicable.

— indicates less than the Proposed Action; + indicates more than the Proposed Action.

*Figures inside parentheses represent the difference between the Proposed Action and the alternative.

**Refer to Chapter 2, Soils and Vegetation, for definition and description of sensitive areas.

***Refer to Appendix 8 for definitions of terms.

However, soil disturbance would be insignificant along both routes because effective use of the erosion control and reclamation procedures outlined in Appendices 3 and 7 would minimize the loss of soil and the reduction of soil productivity and allow for successful reclamation and revegetation.

Water Resources

The Proposed Action would cross the Green River three times, and would cross two small perennial streams. The Sand Wash Alternative would cross the Green River once, the Yampa River once, the Little Snake River once, and six small perennial streams.

The Proposed Action would cross three areas critical to watershed management; the Sand Wash Alternative would cross one.

Agriculture

The Sand Wash Alternative would cause a temporary loss of 58 more *animal unit months* than the Proposed Action, while affecting three less allotments. However, impacts from both routes would be insignificant. The Sand Wash Alternative would cause a 1-year loss of 3 more acres of cropland than the Proposed Action; again, impacts from both routes would be insignificant.

COMPARATIVE ANALYSIS

Visual Resources

The Proposed Action would significantly affect 26 more acres of *Visual Resource Management Class* II areas than the Sand Wash Alternative. The Proposed Action would significantly affect 7 more acres of Class III areas than the Sand Wash Alternative. The Sand Wash Alternative would significantly affect 40 more acres of Class IV areas than the Proposed Action. Acreages may not indicate a true comparison because viewer sensitivity of the acreages viewed along one route may or may not be more critical than disturbed acreages seen from the other routes.

The impacts from the proposed microwave sites would be similar for the two routes because in both cases antennas would be added to existing structures. The Proposed Action could be constructed alongside as many as three other existing pipelines; the Sand Wash Alternative would be built along only one other previously constructed pipeline. Therefore, construction of the Proposed Action could result in a greater cumulative impact than the alternative because more vegetation would be cleared to accommodate the wider right-of-way.

Cultural Resources

The Proposed Action mile-wide study corridor would cross 14 more known cultural sites than the Sand Wash Alternative corridor. The differences between the known cultural sites is not necessarily representative because more of the Proposed Action route has been surveyed than the Sand Wash Alternative. Furthermore, the Sand Wash Alternative could have more cultural sites within its mile-wide study corridor than the Proposed Action, since the alternative is 20 percent longer and the regional archaeology is considered generally the same for both routes.

Recreation Resources

The Proposed Action would cross the Green River twice along segments of the river used intensively by float-boaters and other recreationists (Browns Park area), while the Sand Wash Alternative would not cross any river segment used for intensive recreation purposes. Impacts of the crossings would be insignificant, causing only minor, temporary conflicts with campers. Neither route would significantly increase dispersed recreation demand.

Wilderness

The Proposed Action route would parallel approximately 3 miles of the Red Creek Badlands *Wilderness Study Area (WSA)* boundary. The Sand Wash Alternative would parallel approximately 1.25 miles of the Willow Creek WSA boundary. The alternative pipeline route would also be within 0.25 to 1 mile of the boundaries of the Cross Mountain and Skull Creek WSAs. Project-related direct impacts to wilderness on both routes would be temporary (4 to 6 weeks) due to pipeline construction, and insignificant over the long term. However, indirect impacts to wilderness values in a small portion of Cross Mountain WSA would be permanent and significant because wilderness users could view a short 15 kV power distribution line.

Transportation Networks

Both the Proposed Action and the Sand Wash Alternative could increase traffic enough to temporarily (1 to 8 weeks) but significantly affect traffic flow at several intersections. The traffic congestion would probably be the worst at the end of the working day. Construction along both routes could cause a short-term, small increase in traffic which could increase the potential for accidents. Any accidents could be significant to the travelers involved. Each alternative could cause significant road deterioration to some dirt and gravel roads during wet weather.

The Proposed Action could cause traffic delays over 15 minutes at three locations: the top and bottom of Jesse Ewing Canyon, Browns Park, and Utah State Highway 149 near Dinosaur National Monument. The Sand Wash Alternative would not cause such delays.

The Proposed Action would parallel more miles of existing pipeline that could be accidentally damaged than would the Sand Wash Alternative. Impacts from both routes would be significant but unlikely to occur.

The short-term cumulative impacts from the Proposed Action and the Chevron phosphate slurry pipeline to the transportation network are quite high, while little cumulative impact to transportation networks would occur with the Sand Wash Alternative.

Paleontological Resources

The Proposed Action would cross one area known to have paleontological resources that are valuable to science. The Sand Wash Alternative would not cross any areas known to contain these resources.

Land Use Constraints and Conflicts

The Proposed Action and Sand Wash Alternative would both cross active oil and gas fields and trona lease areas,

possibly causing a conflict with mineral retrieval activities. The Sand Wash Alternative would also cross the Bean Springs Coal PRLA, which could cause future conflicts if the PRLA was leased and developed.

Appendices



REED CANARYGRASS

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Maps for this appendix are in the inside back pockets of this EIS.

APPENDIX 2

CONSULTATION AND COORDINATION

SUMMARY OF PROJECT SCOPING

The first step in preparing an environmental impact statement (EIS) is called “scoping.” The scope of an EIS is the range of actions, alternatives, and impacts to be included in the document; the purpose is to determine the significant issues related to a proposed action which should be included in the EIS. The basic goal of scoping is to make EISs more concise and meaningful to persons in the federal government who must make decisions on the proposal, as well as those in state and local government, and the people who may be affected by approval or disapproval of the proposal or its alternative.

Method of Scoping

The scoping process for the Rangely Carbon Dioxide Pipeline project consisted of agency meetings, mailouts to solicit written comments from the public, and informative conversations with interested parties within the affected area. With the assistance of federal and state agencies, local entities, and private individuals, the significant issues and concerns were identified for analysis in the EIS. Insignificant issues were also identified so that they could be eliminated from the scope of the EIS. Project information and information on the scoping process were published in the *Federal Register* on January 6, 1984.

The mailout questionnaire scoping packets were mailed to interested persons selected in part from the mailing lists of the Chevron Phosphate and Riley Ridge projects. Packets were also sent to anyone requesting them.

Results of Scoping

The results of the scoping process along with further input from various federal and state agencies identified the most significant issues associated with the project. The extent to which each resource is analyzed was partially determined by the concerns raised during scoping. The concerns were consolidated, grouped by resource topic, and put in tabular form. Within each resource topic, the issues were listed in order of importance as determined by the number of persons indicating the issue as a high priority. Finally, votes given that resource topic were totaled.

From these results it was determined that the most significant issues were within the following topics (listed in order of overall significance):

- Socioeconomics
- Wildlife
- Soils and Vegetation
- Water Resources

A detailed report on the EIS scoping process, *Scoping Results: Rangely Carbon Dioxide Pipeline Project* can be obtained from the Bureau of Land Management, Division of EIS Services, First Floor East, 555 Zang Street, Denver, Colorado 80228. The report includes a discussion of the procedures used to analyze the scoping data, lists the issues raised during scoping, and identifies the participants.

PUBLIC INVOLVEMENT

While preparing the draft EIS for the Rangely Carbon Dioxide Pipeline project, the Bureau of Land Management consulted with many federal, state, and local agencies; elected representatives; environmental and citizens groups; industry; and individuals. Many of these participated during the scoping. The following agencies, groups, and individuals will receive a copy of the draft EIS for formal review.

Federal Government Agencies

- Advisory Council on Historic Preservation
- Department of Agriculture
- Forest Service
- Soil Conservation Service
- Department of the Army
- Corps of Engineers
- Department of Energy
- Department of the Interior
- Bureau of Indian Affairs
- Bureau of Mines
- Bureau of Reclamation
- Fish and Wildlife Service
- National Park Service
- Geological Survey
- Environmental Protection Agency
- Federal Energy Regulatory Commission
- Federal Highway Administration
- Interstate Commerce Commission

CONSULTATION AND COORDINATION

State Government Agencies

Colorado
State Clearinghouse
Division of Water Resources
State Office of Archaeology and Historic
Preservation
Oil and Gas Conservation Commission
Utah
State Clearinghouse
Division of Wildlife Resources
Utah State Historic Preservation Office
Wyoming
State Clearinghouse
Department of Economic Policy and Planning
Recreation Commission
Wyoming State Engineers Office
Wyoming State Historic Preservation Office

Local Government Agencies

Colorado
Moffat County
Rio Blanco County
Mayor of Dinosaur
Town of Rangely
Utah
Daggett County
Uintah County
Wyoming
Lincoln County
Sweetwater County
Lincoln-Uinta Association of Governments
Town of Granger

Environmental Groups

Colorado Native Plant Society
Colorado Natural Heritage Inventory
Green River Economic Development Association
Sierra Club
Wyoming Outdoor Council
Wyoming Wildlife Federation

Industries and Individuals

(Detailed list available upon request from Janis
VanWyhe, Division of EIS Services, Denver, Colorado.)

State Legislators

Colorado
Utah
Wyoming

U.S. Senators and Representatives

Colorado
Utah
Wyoming

Copies of the draft EIS may be obtained from:

Bureau of Land Management
Division of EIS Services
555 Zang Street
First Floor East
Denver, Colorado 80228

A limited number of copies may also be obtained from
the following BLM offices:

Colorado
Colorado State Office
1037 20th Street
Denver, Colorado 80202

Craig District Office
P.O. Box 248
Craig, Colorado 81625

White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

Utah
Utah State Office
University Club Building
136 East South Temple
Salt Lake City, Utah 84111

Vernal District Office
170 South 500 East
Vernal, Utah 84078

Wyoming
Wyoming State Office
2515 Warren Avenue
P.O. Box 1828
Cheyenne, Wyoming 82003

Rock Springs District Office
P.O. Box 1869
Rock Springs, Wyoming 82901-1869

Big Sandy/Salt Wells Resource Areas
P.O. Box 1170
79 Winston Drive
Gateway Building
Rock Springs, Wyoming 82902-1170

Kemmerer Resource Area
P.O. Box 632
Kemmerer, Wyoming 83101

APPENDIX 3

REQUIRED FEDERAL MEASURES, RECLAMATION PROCEDURES, COMPANY STANDARD CONSTRUCTION AND OPERATION PROCEDURES, AND OTHER MEASURES DESIGNED TO REDUCE ENVIRONMENTAL IMPACTS

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REQUIRED GENERAL FEDERAL RESOURCE MEASURES

As a condition for granting the various rights-of-way and permits, the authorizing agencies require that certain terms and conditions be met. The general federal resource measures are presented here. As project plans are finalized and before authorization is given, specific requirements will be added by the various authorizing agencies.

1. Wildlife

- a. Construction of the pipeline crossing of the Green River at Proposed Action and Alternative MP 38, will be completed after March 1 or before September 30. This is due to the fall spawning of the brown trout and the migration of the Kokanee salmon. For the protection of spawning rainbow trout, the construction of the pipeline crossing will not be conducted from April 1 to June 30. The allowable periods at this crossing are the months of March, July, August and September. Any exceptions must be approved by the authorized officer.

No construction activity will be authorized at the Green River crossing at Proposed Action MP 143, T. 1 N., R. 25 E., between September 30 and March 1 due to brown trout spawning and incubation. The allowable period at this crossing is March, April, May, June, July, August, and September 1-14.

- b. The Company will allocate sufficient funds and time in advance of construction of any element of the project and its related facilities in order to perform Fish and Wildlife Service approved inventories on any listed threatened and endangered species determined by the Fish and Wildlife Biological Opinion, if it is determined that listed species or their habitats may be present and could be affected by the proposal, appropriate consultation with the Fish and Wildlife Service will be conducted by the federal authorizing agency. No activities will be authorized until consultation is complete as specified by Section 7(c) of the Endangered Species Act. The Biological Opinion issued by the Fish and Wildlife Service as a result of the consultation process will detail the specific mitigation measures to be carried out by the Company.

c. The Company shall comply with existing county, state, and federal laws involving the protection and preservation of feral horses, feral burros, and raptors, and game and non-game wildlife species.

d. In order to protect big game winter range and prevent harassment to wildlife during the critical winter and calving/fawning periods, construction activity will be allowed only from April 1 to December 15 on winter ranges and from July 1 to May 1 on calving/fawning habitat. This limitation does not apply to maintenance and operation of this right-of-way. Any exceptions to the requirement must be obtained in writing from the authorized officer.

e. No construction, disturbing activities, or the building of permanent facilities will be permitted within the prescribed distance or during the breeding/nesting period of the following:

Raptor	Distance	Dates
Bald Eagle	2.0 km (1.2 miles)	March 1-July 15
Golden Eagle	1.0 km (0.6 miles)	March 1-July 15
Red-Tailed Hawk	0.5 km (0.3 miles)	April 1-July 15
Swainson's Hawk	1.0 km (0.6 miles)	April 1-July 15
Ferruginous Hawk	2.0 km (1.2 miles)	April 1-July 15
Prairie Falcon	1.0 km (0.6 miles)	April 1-July 15
Merlin	1.0 km (0.6 miles)	May 1-August 15
Harrier	1.0 km (0.6 miles)	April 1-July 15
Burrowing Owl	1.0 km (0.6 miles)	April 15-July 15

f. Pole type designs shall be raptor safe as per *Suggested Practices for Raptor Protection on Powerlines for Power Transmission Lines* (Olendorff 1981).

g. No occupancy or other surface disturbance will be allowed within 2 miles from the center of a sage grouse strutting ground (lek) from March 1 through June 30 unless permitted by the authorized officer.

h. Survey the prairie dog colonies on the proposed project route for the presence of black-footed ferrets and for breeding/nesting of burrowing owls before completing final engineering plans. If present, consult with the Wyoming Game and Fish Department, Utah Division of Wildlife, or Colorado Division of Wildlife, as appropriate, and Fish and Wildlife Service before proceeding.

REQUIRED FEDERAL RESOURCE MEASURES

- i. Pipeline construction in the *Rye Grass Draw* area should not occur from May 15 to June 15, unless approved by the authorized officer, due to significant elk calving in this area.

2. Water Resources

- a. When rivers, streams, and washes need to be crossed for access to project facilities, existing roads or bridges will be used unless otherwise designated by the authorized officer. Culverts or bridges will be installed at points where new permanent access roads cross live streams to allow fish unobstructed passage. Where temporary roads cross drainages or dirt fills, culverts will be installed during construction and removed upon completion of the project. Any construction activity in a perennial stream is prohibited unless specifically allowed by the authorized officer. All stream channels and washes will be returned to their natural state.
- b. Construction equipment will be refueled and maintained outside of stream channels in areas designated by the authorized officer.
- c. In order to minimize damage in the Red Creek Basin Watershed and areas with severe winter conditions, construction activity will be allowed only from May 15 to November 1. This limitation does not apply to maintenance and operation of this right-of-way. The authorized officer may make further restrictions as necessary to minimize damage or make exceptions as appropriate. Such modification must be in writing.

3. Soils and Vegetation

- a. Existing soils and geological data shall be gathered by the Company and used to achieve maximum revegetation and minimum soil erosion.
- b. Areas subject to mudflows, landslides, mudslides, avalanches, rock falls, and other types of mass movement will be avoided where practical for locating linear facilities. Where avoidance is not practical, the design, based upon detailed field investigations and analyses, will provide measures to prevent the *accelerated* occurrence of mass movements. A full scale engineering diagram and staking

must be done in these locations. If a slide occurs, repair of damages will be the responsibility of the Company. A plan for such restoration would be presented to the authorized officer for approval.

- c. Commercial tree species to be cut will be measured and counted.
- d. All trees will be cut so that stumps are no more than 6 inches high.
- e. Mountain brush and tree covered areas will be precleared before dozer and maintenance blade work. Preclearing will involve cutting brush and trees and removing them to designated areas.

4. Agriculture

- a. To prevent interference with livestock trailing, construction will be coordinated between the grantee, livestock operators, and the authorized officer.
- b. Gaps will be left between adjacent lengths of pipe at suitable intervals and at well-defined trails to permit the passage of livestock and vehicles during the time interval between stringing and other construction operations.

5. Visual Resources

- a. All aboveground structures not subject to safety requirements shall be painted by the Company to blend with the natural landscape. The paint used shall be a color or colors which simulates *Standard Environmental Colors* designated by the Rocky Mountain Five-State Interagency Committee (Wyoming 1982). The color(s) selected for this project including name and Hunsell Soil Color Number will be included in the Construction and Operation (CO) Plan.

6. Cultural Resources and Paleontology

a. CULTURAL RESOURCES

- (1) "Prior to project construction, the Company, in consultation with the authorized officer and the Wyoming, Utah, and Colorado State Historic

APPENDIX 3

Preservation Offices, will use available cultural resource data to develop a plan to locate cultural resources that would be directly affected by the proposed project. A Class III (100 percent pedestrian) cultural resource inventory shall be conducted on all previously uninventoried lands of the pipeline and support facilities by a qualified professional archaeologist acceptable to the BLM. A report of the inventory will be submitted and approved by the BLM with stipulations as appropriate in order to comply with the Archeological Resources Protection Act of 1979, as amended, and Section 106 of the National Historic Preservation Act of 1966. The inventory report will evaluate cultural resources identified during the field inventory for their eligibility for nomination to the National Register of Historic Places and make recommendations for the management of all eligible or potentially eligible sites.”

- (2) The Company will provide a Bureau of Land Management (BLM) approved archaeologist to execute or monitor the survey for cultural resources during construction of all project facilities.
- (3) If, in its operation, the Company discovers any cultural remains, monuments or sites, or any object of antiquity subject to the Antiquities Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. secs 431–433), and 43 CFR, Part 3, the Company shall immediately cease activity and report directly to the Area Manager. The BLM shall then take such action as required under the Acts and regulations thereunder. The Company shall follow the mitigation requirements set forth by BLM concerning protection, preservation, or disposition of any sites or material discovered. In cases where salvage excavation is necessary, the cost of such excavations shall be borne by the Company unless otherwise stated.
- (4) All significant cultural resources identified within the project area will be avoided wherever possible. For significant cultural resources that cannot be avoided, a Memorandum of Agreement with the Advisory Council of Historic Preservation and the Wyoming, Utah, and Colorado State Historic Preservation Offices will be

developed that details specific mitigation measures in accordance with 36 CFR 800.

- (5) The archaeologist will notify the BLM authorized officer a minimum of 3 working days before site monitoring. Construction methods will be used that allow the archaeologist to identify buried cultural resources without endangering the personnel who are monitoring the surface disturbance. If any potentially significant buried resources are identified either along the route or on sites to be used for surface facilities and the archaeologist determines that further operations will seriously affect the cultural resources, work will be suspended and BLM will evaluate the resource and develop additional stipulations as needed. The cost for avoidance or salvage of any cultural resources identified by the archaeologist will be that of the operator. A report of all activities of the archaeologist will be submitted to BLM within 30 days following completion of the monitoring.
- (6) The authorized officer(s) may require the Company to relocate the proposed pipeline in order to avoid destruction of archaeological, paleontological, or historical values, or to delay construction until salvage operations are completed. All salvage from federal land shall remain the property of the United States and shall be turned over to the BLM.

b. PALEONTOLOGY

The Company will provide a qualified paleontologist who is approved by the authorized officer. The paleontologist will conduct an intensive survey of all project areas prior to any disturbance according to the significance and mitigation needs specified by BLM. The paleontologist will be available, as determined by the authorized officer, during surface disturbance. If, in the opinion of the paleontologist, paleontological values specified by BLM would be disturbed, construction will be halted until appropriate action can be taken.

7. Transportation Networks

- a. The pipeline and power line rights-of-way will be used as access roads only when necessary during the construction period and only during

REQUIRED FEDERAL RESOURCE MEASURES

emergencies after completion. Uses will be only as approved by the authorized officer.

- b. The Company will control off-road vehicle use on the rights-of-way. Specified control could include physical barriers, replanting of trees, or other reasonable means of off-road vehicle control.
- c. Gates or cattle guards on established roads on public land will not be locked or closed by the Company unless the gates or cattle guards were originally locked or closed.
- d. Construction in Jesse Ewing Canyon, which would interfere with the vehicle use on the existing road, will not occur during the Labor Day weekend or during the first 2 weeks of big game hunting season.
- e. The Company will comply with existing federal, state, county, and private requirements developed for the protection of all existing facilities. Load limit restrictions will vary from state to state, with each type of roadway and the time of the year. This could limit the hauling of heavy loads on specific roadways during specified times.

8. Land Uses

- a. Disturbances of improvements such as fences, roads, and watering facilities during the construction and maintenance of the rights-of-way must be kept to an absolute minimum. If damage to improvements should occur, immediate action will be taken to restore such improvements to at least their former condition. Functional use of these improvements must be maintained at all times.
- b. If a natural barrier used for livestock control is broken during construction, the Company will adequately fence the area to prevent drift of livestock. In pronghorn ranges, the fence may have to be constructed so that animals may pass. Fence specifications will be determined on a case-by-case basis.
- c. All fencing constructed by the Company will meet BLM requirements except where total exclusion is required.

9. Waste Disposal

- a. Construction sites shall be maintained in a sanitary condition at all times; waste at those sites shall be disposed of promptly. *Waste* means all discarded matter, including human waste, trash, garbage, refuse, oil drums, petroleum products, construction materials, ashes, and equipment.
- b. A litter policing policy shall be developed, approved by the authorized officer, and followed on all roads and sites associated with the project.
- c. Oil waste, toxic materials, and solid or liquid wastes shall be dumped only in authorized waste disposal sites. No burying of debris or waste materials will be allowed, except as specifically authorized by the authorized officer.

10. Air Quality

Major access roads will be watered or other approved dust abatement procedures will be used to prevent severe wind erosion and loss of soil materials during construction.

11. Miscellaneous

- a. When all development and rehabilitation have been completed, a joint compliance check of the right-of-way will be made by the Company and the authorized officer or designated representative to determine compliance with the terms and conditions of the grant. The Company will perform, at its own expense, any required modifications or additional reclamation work for compliance with the terms of the grant.
- b. An *as built* survey map will be submitted to the authorized officer(s) within 60 days after construction is completed.
- c. Whenever the authorized officer identifies a weed control problem, the Company will be responsible for weed control on distributed areas within the exterior limits of the grant. The Company is responsible for consultation with local county weed and pest supervisors for the most appropriate weed control

methods. Pesticides shall be used in accordance with written instructions from the authorized officer. These instructions should be obtained prior to December 1 if use is planned for the next year. Emergency use may occur with approval from the authorized officer. Pesticides shall not be permanently stored on public lands authorized for use under this grant.

SPECIFIC FEDERAL MEASURES

U.S. Department of the Army, Corps of Engineers

The Army Corps of Engineers has prescribed management practices that should be followed, to the maximum extent practical, for discharges covered by the Nationwide 404 Permit (items 1 through 8).

Additionally, certain conditions (33 CFR 323.4-3(b)) must be met under the Nationwide Permit authority (items 9 through 16). For further detail, please refer to the Army Corps of Engineers Permit Program, *A Guide for Applicants*, November 1, 1977.

1. Discharges of dredged or fill material into United States waters should be avoided or minimized through the use of other practical alternatives.
2. Discharges in spawning areas during spawning seasons should be avoided.
3. Discharges should not restrict or impede the movement of aquatic species indigenous to the waters, impede the passage of normal or expected high flows, or cause the relocation of the waters (unless the primary purpose of the fill is to impound water).
4. If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow should be minimized.
5. Discharges in wetlands areas should be avoided.
6. Heavy equipment used in wetlands should be placed on mats.
7. Discharges into breeding and nesting areas for migratory waterfowl should be avoided.

8. All temporary fills should be removed in their entirety.
9. There cannot be any change in preconstruction bottom contours. (Excess material must be removed to an upland disposal area.)
10. The discharge cannot occur in the proximity of a public water supply intake structure.
11. The discharge cannot destroy a threatened or endangered species as identified under the Endangered Species Act nor endanger the critical habitat of such species.
12. The discharge cannot disrupt the movement of those aquatic species indigenous to the water body.
13. The discharge must consist of suitable material that is free of toxic pollutants in other than trace quantities.
14. The fill created by a discharge must be properly maintained to prevent erosion and other nonpoint sources of pollution.
15. The discharge must not occur in a component of the national wild and scenic river system or in a component of a state wild and scenic river system.
16. No access roads, fills, dikes, or other structures can be constructed below the ordinary high water of the streams specified under the Nationwide Permit. These structures would require separate Section 404 permits.

U.S. Environmental Protection Agency

Since construction of the pipeline will involve river crossings, a Nationwide Section 404 Permit will be required. Generally river crossings are covered under the permit, although specific permits (Individual 404 and Section 10 permits) will be required for important crossings. An individual permit will be required if filling of any wetlands is involved. The U.S. Environmental Protection Agency reviews the applications for 404 permits administered by the Army Corps of Engineers and provides recommendations for action on the permit including mitigation measures. For this project, the U.S. Environmental Protection Agency will likely recommend the following measures for the Green River crossings:

REQUIRED RECLAMATION—EROSION CONTROL PROCEDURES

- a. Dredged materials should be stored away from the flowing waters
- b. Disturbed wetland or riverine areas should be revegetated with native trees, shrubs, and grasses where applicable;
- c. The permit should consider appropriate times for river disturbance which do not interrupt spawning cycles of various fish species; this may involve identifying the “gaps” or “windows” for construction between different spawning seasons.

Additional mitigation measures will be considered for the following areas after more details are received:

- d. Provisions for backfillings;
- e. Lengths of riprapping involved; perhaps some limitations to minimize use of riprap.

on state land affected by project action as required by the Wyoming State Department of Environmental Quality, Land Quality Division, guidelines.

3. When operating on Colorado state land, the Company will prepare and follow appropriate plans, including applicable measures and procedures, to accomplish and ensure successful reclamation of state land affected by project action, as required by the Colorado State Department of Natural Resources guidelines.
4. The Company will comply with the erosion control and reclamation programs it has developed and will follow through on its commitment to *comply with appropriate regulations and required plans and stipulations to protect and restore any land disturbed by project construction and operation to a stable, productive, and aesthetically acceptable condition.*
5. The Company will develop a detailed, site-specific reclamation plan as part of its CO Plan. Because the proposed rights-of-way are composed of many types of terrain, soils, vegetation, land uses, and climatic conditions, the detailed plan will include sets of techniques and measures tailored to each condition encountered. Local expertise and locally effective reclamation methods will be followed when the specific procedures for the detailed reclamation plan are developed. The erosion control, revegetation, and restoration guidelines and CO plan will be implemented under the direction of the authorized officer.
6. Details on applicable techniques of erosion control and reclamation for technical assistance to private landowners will be obtained as required by the private landowner from local Soil Conservation Service Districts. Technical assistance and approval of written plans for federal lands will be obtained from the BLM before any construction.
7. During construction of the project, an on-site reclamation specialist will be employed by the Company to provide: (a) liaison with private landowners, federal agency officials, and local governments; (b) expertise for directing applicable restoration procedures when special conditions are encountered, without causing construction delays; and (c) favorable public relations.

REQUIRED RECLAMATION AND EROSION CONTROL PROCEDURES

The following procedures will be required for use on federal land. The Company has stated it would follow or has agreed to follow these procedures on all federal, state, and private lands as appropriate and agreed to by the landowner. The procedures outlined in this appendix will be incorporated as stipulations in any federal right-of-way grant that may be issued, and will be used by the Company to develop its Construction and Operation Plan. These procedures will be applied during all phases of the project (construction, operation, and abandonment).

1. When operating on Utah state land, the Company will prepare and follow appropriate plans, including applicable measures and procedures, to accomplish and ensure successful reclamation of state land affected by project action, as required by the Utah State Department of Natural Resources, Division of Oil, Gas, and Mining (State of Utah 1953).
2. When operating on Wyoming state land, the Company will prepare and follow appropriate erosion control and reclamation plans including applicable measures and procedures to accomplish and ensure successful reclamation

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8. General erosion control and restoration measures have been developed for the following areas:

- Right-of-way and Site Clearing
- Trenching and Preservation of Topsoil
- Backfilling and Grading
- Land Preparation for Seeding and Cultivation
- Revegetation
- Maintenance and Monitoring
- Use of Biochemicals

Right-of-way and Site Clearing

Emphasis will be placed on protecting existing vegetation and minimizing disturbance of the existing environment.

- Land grading will be done only on the area required for construction.
- Sidehill cuts that are approved in the CO plan will be kept to a minimum to ensure resource protection and a safe and stable plane for efficient equipment use. The authorizing agency will provide assistance as necessary.
- Existing ground cover such as grasses, leaves, roots, brush, and tree trimmings will be cleared and piled only to the extent necessary. Slash will be piled and later shredded and chipped for use in restoration operations or disposed of at the discretion of the authorized officer.
- Trees and shrubs that are not to be cleared from the right-of-way will be protected from damage during construction.
- Where the right-of-way crosses streams and other water bodies, the banks will be stabilized to prevent erosion. Construction techniques will be designed to minimize damage to shorelines, recreational areas, and fish and wildlife habitat.
- A buffer strip of terrestrial vegetation above the high water line will be left between work staging areas adjacent to the stream and the stream itself.
- Care will be taken to avoid pollution in all areas including streams and other water bodies and in their immediate drainage areas. Spills will be cleaned up as required by the authorized officer or landowner.

- Design and construction of all temporary roads will be based on an approved transportation plan and will ensure proper drainage, minimize soil erosion, and preserve topsoil. After abandonment, these roads will be closed and the areas restored without unnecessary delay or maintained at the discretion of the landowners. Restoration, including redistribution of topsoil, will be to the satisfaction of the landowner and/or regulatory officials.

- During wet and muddy weather conditions, as determined by the on-site reclamation specialist, the authorized officer will issue stop and start orders to prevent rutting or excessive tracking of soil and deterioration of vegetation in the right-of-way area.
- During construction activities near streams or lakes, sedimentation (detention) basins and/or straw bale filters will be constructed to prevent suspended sediments from reaching downstream watercourses or lakes, as required by the authorized officer.
- Actual construction activities will immediately follow clearing operations, especially in areas where soils are highly susceptible to wind or water erosion and other special areas.

Trenching and Preservation of Topsoil

To facilitate complete project site reclamation, topsoil will be removed from disturbed land within the project area as necessary. Topsoil stockpiles will be mulched as necessary and seeded to reduce wind and water erosion. Trenching methods and techniques would ensure that

- Topsoil will be removed from the trench area by double-ditching or other company proposed method approved by the authorized officer. Topsoil needs to be windrowed separately, protected, and replaced last during backfilling.
- Remaining unearthed materials will be removed and stored in a manner that facilitates backfilling procedures, uses a minimum amount of right-of-way area, and protects the excavated material from vehicle and equipment traffic.
- Cofferdams or other diversionary techniques will be used where necessary to permit flow in one part of a stream while pipelaying construction occurs in another part.

REQUIRED RECLAMATION—EROSION CONTROL PROCEDURES

- A specific trenching and excavated material stockpiling procedure will be used on steep-sloping and rough, broken terrain to ensure minimum disturbance as outlined in the CO plan. This procedure will be developed by both the authorized officer and the Company.

Backfilling and Grading

- Backfill will be replaced in a sequence and density similar to the preconstruction soil condition.
- Backfilling operations will be conducted in a manner that would minimize further disturbance of vegetation.
- The contour of the ground will be restored to permit normal surface drainage.
- In steeply sloping and steep terrain, erosion control structures such as water bars, diversion channels, and terraces will be constructed to divert water away from the pipeline trench and reduce soil erosion along the right-of-way and other adjoining areas disturbed during construction.
- All structures such as terraces, levees, underground drainage systems, irrigation pipelines, and canals will be restored to preconstruction conditions so that they function as originally intended.
- The surface will be graded to conform to the existing surface of the adjoining areas except for a slight crown over the trench to compensate for natural subsidence. In cropland areas, especially border-and furrow-irrigated cropland, the soils (backfill) within the trench would be compacted and the crown smoothed to match the bordering area to allow surface irrigation.
- Topsoil will be uniformly replaced over the trench fill and other disturbed areas to restore productivity to preconstruction conditions.
- Materials unsuitable for backfilling or excess backfill material will be disposed of as arranged by the authorized officer(s).
- Temporary work space or staging areas used at stream and highway crossings and other special sites will be restored to approximately preconstruction conditions and to the satisfaction of the authorized officer(s).

- The rights-of-way at stream crossings will be restored as nearly as possible to preconstruction state soon after completion of construction. The upland areas and banks will be revegetated to preconstruction conditions; where this is not possible, they will be mulched with rock. The size of the rock mulch will be larger in diameter than materials excavated from the trench. The streambed will be returned to its original contours with sediments similar to those that were excavated and as approved by the authorized officer. All drainages crossed by the pipeline will be kept free of vegetative debris, and channels will be reopened following construction operations.
- For rights-of-way through steep terrain or wet areas, land must be graded at two elevations (two-toning), or diversion dams built, or other Company proposed methods used to facilitate construction, as approved by the authorized officer. The areas will be contoured upon completion of construction to resemble the original grade as nearly as possible and as agreed to by the authorizing officer in consultation with the Company.

Land Preparation for Seeding and Cultivation

Construction, backfilling, and grading commonly cause compaction and later soil conditions that could affect soil productivity and/or seeding success in the right-of-way area. The following practices and techniques will be used to improve these soil conditions, protect soil from erosion, and provide a favorable seedbed:

- In cropland areas, as required by the authorizing agency or landowner, subsoiling or chiseling will be used to ensure that soil compaction is reduced and preconstruction soil permeability, restored.
- Chiseling will be used in rangeland areas to reduce compaction and improve soil permeability unless there are objections from the landowner or authorizing agency. Pitting the contour furrowing as directed by the authorizing agency or landowner will be done on disturbed areas with steeper slopes to increase infiltration and to reduce runoff and erosion.
- Suitable mulches and other soil stabilizing practices will be used on all regraded and topsoiled areas to protect unvegetated soil from wind and

water erosion and to improve water absorption. Areas and types of mulches will be identified by the Company in the CO plan and approved by the authorized officer.

- Special mulching practices or matting will be needed to protect seeding, seedlings after germination, and plantings in critical areas where wind and water are serious erosion hazards.
- Commercial fertilizers will be applied to soil areas with low inherent fertility and where woody materials are chipped and used as mulch, to maintain crop yields and establish grass seedlings. Application rates will be commensurate with annual precipitation and available irrigation water. Areas needing commercial fertilizers will be identified by the Company in the CO plan.
- Seedbeds for areas seeded to grass will be prepared so that they will provide a suitable condition for the establishment of grass stands.
- Rock mulches may be used as determined in the CO plan in steep-sloping rock outcrop areas and low precipitation areas to reduce erosion and promote vegetation growth.
- Cultivation and land preparation operations on steeply sloping areas will be done on the contour to minimize erosion.
- Soil areas with rock fragments such as very coarse gravel, cobble, or stone scattered on the surface will be restored to the original preconstruction surface condition to blend with the adjoining area, to avoid a smooth surface right-of-way area, and to control accelerated erosion.

Revegetation (Reseeding and Planting)

All disturbed areas will be reshaped and revegetated as nearly as possible to their original condition or to a condition agreed upon by both the Company and the authorized officer. This reclamation will be accomplished as soon as possible after the disturbance occurs. Revegetation efforts will continue until a satisfactory vegetative cover is established. The following practices and techniques will be used in areas where reseeding is suitable, as determined by the authorizing agency:

- A firm seedbed will be prepared prior to seeding. This will include a mulch of plant

residues or other suitable materials. A cover crop may be needed in larger disturbed areas.

- Seed will be planted by drilling, broadcasting, or hydroseeding. Wherever possible, planting will be done with a drill. Drill seeding with a grass drill equipped with depth bands will be used where topography and soil conditions allow, to meet the seeding requirements of the species being planted. Broadcast seeding will be used in inaccessible or small areas when broadcasting the amount of seed used in drilling will be doubled. Seed will be covered by raking or harrowing. Critical areas will be hydroseeded as determined by the reclamation specialist or authorized officer.
- Only species and varieties of species adaptable to local soil and climatic conditions will be used; generally these would be native species. However, introduced species may be considered for specific conditions when approved by the landowner and regulatory authority. Seeding rates in critical area plantings and generally throughout the right-of-way will be increased 100 percent over regular seeding rates in order to compensate for seed mortality from adverse growing conditions.
- Seed testing will be conducted to meet federal, state, and agency seed requirements.
- Seeding will be done when seasonal or weather conditions are most favorable, and as determined by the landowner or authorized officer.
- Grazing or mowing will be delayed at least one season after seeding, especially in highly erodible areas, in order to provide time for vegetation to become established unless otherwise agreed upon by the landowner or lessee and the authorized officer. Protective fencing may be necessary in special areas as agreed upon and will be constructed, maintained, and removed according to authorizing agency or landowner specifications.
- In areas of low annual precipitation (generally less than 8 to 10 inches), where reseeding is not suitable or as successful, erosion control structures and measures will be applied on sloping areas to reduce accelerated erosion and to allow reestablishment of preconstruction surface soil conditions and natural revegetation.
- Trees and shrubs will be reestablished in areas as specified in the revegetation plan. Temporary

REQUIRED RECLAMATION—EROSION CONTROL PROCEDURES

and/or permanent structures will be installed by the Company at specific locations along the right-of-way and other disturbed sites to prevent off-road vehicle access.

Maintenance and Monitoring

Joint inspection of the reclaimed areas by the applicant and authorized officer will be conducted to monitor the success and maintenance of erosion control measures and revegetation programs on native grazing land for a period determined by the landowner on private land or the authorized officer on state or federal land. The monitoring program would identify problem areas and corrective measures to ensure cover and erosion control. Certification of successful revegetation and erosion control will be determined by the landowner or authorized officer.

Use of Biochemicals

The use of biochemicals such as herbicides, fungicides, and fertilizers will comply with state and federal laws, regulations, and policies regarding the use of poisonous, hazardous, or persistent substances. State and federal wildlife agencies will be contacted if application of any of these substances will be on or near sensitive wildlife areas. These substances will be applied by ground methods. Before these substances are used on or near the permit or grant area, the Company will obtain approval of a written plan for such use from the authorized officer, landowner, or appropriate wildlife agency. The plan will outline the kind of chemical, method of application, purpose of application, and other information as required, and will be considered as the authorized procedure for all applications until revoked by the authorized officer, landowner, and/or appropriate wildlife agency. This plan will become part of the CO Plan.

COMPANY STANDARD CONSTRUCTION AND OPERATION PROCEDURES DESIGNED TO REDUCE ENVIRONMENTAL IMPACTS

The Company has stated that the following procedures will be followed in the construction of the proposed Rangely Carbon Dioxide Pipeline project.

Construction Timing

1. Right-of-way construction will be scheduled to avoid critical wildlife habitats during primary use periods as identified in BLM Management Framework Plans and state wildlife agency recommendations.
2. Pipeline construction activities on irrigated cropland will be timed, as nearly as possible, in order to avoid disruption of irrigation delivery systems during the major irrigation season and to reduce effects on crop production in construction areas as well as adjoining irrigated cropland areas served by the systems.
3. Pipeline construction activities in narrow floodplain areas subject to high erosion hazards will be timed in order to avoid high water flows as much as possible, which will reduce the effects of construction on erosion and sedimentation.

Construction Procedures

1. All solid construction wastes from the plant site will be disposed of in the Sweetwater County sanitary landfill. Solid wastes from the right-of-way will be disposed of in approved landfill sites. Sanitary wastes produced before completion of the wastewater treatment system will be handled by a contractor who will provide portable toilets.
2. Water trucks will moisten the work surfaces to suppress dust during construction of the plant complex.
3. The Company will adhere to Occupational Safety and Health Administration rules and regulations during the construction and operation phases.
4. All culverts, bridges, and ditches will be designed to pass the appropriate peak runoff event. This will vary from a 10- to a 100-year event as presented by the Company in the CO plan and approved by the authorized officer.
5. Where fences are encountered along the rights-of-way, adequate bracing will be installed at each edge of the right-of-way before wires are cut and temporary gates installed. At the completion of construction, the opening will be closed using fencing of a quality equal to or greater than that of the original fencing.

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6. Where blasting is necessary, the Company will adhere to the following safety precautions in all instances.
 - In areas of human use, shots will be blanketed (matted).
 - Landowners or tenants in close proximity to the shot will be notified in advance so that livestock and other property can be adequately protected.
 - Before detonation, a clearance will be made to ensure that construction personnel and local residents are removed from the blast area.
7. When required, materials for approaches and fill will be obtained from: (a) the right-of-way; (b) commercial sources (which would require transportation to the location); or (c) adjacent lands where permitted by the federal surface management agency or the landowner.
8. In remote areas with no existing access roads, the pipeline right-of-way will be the primary path of surface travel for pipeline construction. Generally, roadbeds supporting paved roadways will be crossed by boring beneath the bed and inserting casing pipe rather than by ditching across the surface.
9. Stream gradients will be maintained by removing all spoil from the bed upon completion of construction. Banks will be restored to resemble their original grade, and sand-cement sacks, breakers, or riprap will be placed over the pipeline where necessary.
10. Structures will be painted in neutral tones, except where required for aircraft warning.

Operation and Maintenance

1. Permanent access along the pipeline right-of-way will not be maintained. Temporary permits will be obtained for areas where existing roads or trails cannot be used for emergency access.
2. If herbicides are required for suppression of weeds around project components, they will be applied in accordance with manufacturer's recommendations and in accordance with federal and state regulations.

Abandonment

1. Foundations will be broken and buried. Topsoil will be spread over disturbed areas. Mulch, at the rate of 2 tons per acre, will be spread over the topsoil and anchored with a crimping disc prior to seeding.
2. Seeding will occur after October 15 so all winter and spring moisture can be used. Seeding will normally be done by drilling, but steep slopes and small areas may be seeded by manual broadcasting at twice the seed rates. If broadcast, the seeds will be covered by dragging, chaining, raking, or other means.

SPECIAL FEDERAL MITIGATION MEASURES

The following mitigation measures were identified during the process of impact analysis for the Chevron Phosphate Project to further alleviate or minimize potential environmental effects from the proposed developments. The federal agencies are committed to these measures and the measures will become stipulations attached to any right-of-way grants that may be issued for both the Chevron Phosphate and Rangely CO₂ Pipeline projects. These measures apply to the Proposed Action and Sand Wash Alternative as appropriate, and are in addition to the standard measures.

Chevron will be required

- to temporarily deter the sediment that could result from construction on the *Red Creek Basin Escarpment*. To allow for stabilization, two check
- dams will be built on the major drainages coming from the escarpment. The dams will have a sufficient capacity to handle runoff. Design specifications will be determined during preparation of the CO plan.
- to reduce the possibility of sloughing and resulting sediment from the wet areas on the *Red Creek Basin Escarpment*. Horizontal drains or other appropriate techniques will be employed that will outlet on the surface onto a riprap apron. Design specifications will be determined during preparation of the CO plan.

SPECIAL FEDERAL MITIGATION MEASURES

- to surface (gravel) all permanent roads that will be used on continuous basis during operation of the project. This will minimize rutting and erosion during wet periods.
- to develop a strategy that mitigates the socioeconomic impacts that have been identified.
- to provide maximum protection to any river or stream that would be crossed by the pipeline. Pipeline valves should be installed on both sides of the stream or the best possible pipeline rupture prevention technology used.
- to develop mitigation measures in coordination with the Wyoming Game and Fish Department and the Fish and Wildlife Service to prevent bird losses in the gypsum pond as problems develop. Prevention of losses of migratory birds is mandated by the Migratory Bird Treaty Act.
- to oil or water all soft-surfaced major access roads during construction, including those used during the primary recreation seasons from May through September, to keep visibility impacts from dust to a minimum.
- to minimize road cuts and fills when constructing new roads or upgrading existing areas to minimize the contrast in landform modification and contrast for the visual resource.
- to double cut ends of culverts to match the road cut slopes, or to use preformed end sections when installing culverts for roads in areas of high or medium visual sensitivity in order to reduce the visual contrast caused by the addition of a structure to the landscape.
- to ensure that the people in Browns Park and Dutch John and all other people of interest within Daggett County are notified of any road closures in *Jesse Ewing Canyon*.
- to ensure periodic access through *Jesse Ewing Canyon* during the work day, especially for emergencies and after the work shift each night.
- to use self-weathering steel for guard rails if the authorized officer deems guard rails are necessary, in areas of high or medium visual sensitivity in order to reduce the visual contrast caused by the addition of the structures to the landscape.
- to use long spans at right angles, when feasible, where power distribution lines unavoidably cross roads in areas of high or medium visual sensitivity in order to minimize the visual contrasts to form, line, and color from the added structures and conductors.
- to locate the pipeline as close as possible to existing pipelines as determined by the authorized officer in order to reduce the width required for the corridor.
- to blend pipeline clearings with natural vegetative clearings and patterns so that they are natural in appearance, or to place pipelines along existing side roads to minimize visual contrast with the natural landscape.
- to use proper trenching and backfill techniques to replace soils (in areas where subsoil colors are different from surface soil colors or where visual sensitivity is high or medium) so color contrasts do not result in lessening the visual quality of an area.
- within the *Rye Grass Draw* area as viewed from the Green River and north of *Jesse Ewing Canyon*, apply special measures, such as removing additional vegetation or applying soil additives, to reduce the visual color contrast between the cleared rights-of-way and existing vegetation, as directed by the authorized officer.

STATE OF WYOMING, OFFICE OF INDUSTRIAL SITING ADMINISTRATION (ISA), PERMIT CONDITIONS TO MITIGATE ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS OF THE CHEVRON PHOSPHATE PROJECT

The following conditions were required by the State of Wyoming, Office of Industrial Siting Administration (ISA) for the Chevron Phosphate Project. These measures were included in this EIS because with their application the cumulative impacts of the Proposed Action plus the Chevron Phosphate Project would be less.

1. The Applicant will participate in the development and implementation of a mitigation program to address project-related impacts on the Wyoming Game and Fish Department. If a temporary warden position is required during construction and funding is unavailable from other sources, the Applicant will fund a temporary position for that time.

APPENDIX 3

2. The Applicant will coordinate with the Wyoming Game and Fish Department regarding scheduling of construction activities in the Red Creek Badlands and in other important big game ranges, and will follow the reasonable recommendations of the Wyoming Game and Fish Department in consultation with BLM regarding scheduling of activities in these areas.
3. Applicant's contractors and subcontractors shall establish payroll and general disbursement accounts at banks in Rock Springs to the extent practical during the construction and operation phases of the project. Chevron shall establish general disbursement accounts to the extent practical. During the operational phases of the project, Chevron will maintain a local account.
4. The Applicant, its contractors, and subcontractors, shall have a sales and use tax license for Sweetwater County. Before construction, the Applicant will participate in the information seminar conducted by the State Department of Revenue.
5. Since construction of the facility will generate impact assistance payments, the Applicant shall report to the State Treasurer, the Department of Revenue and Taxation, and the ISA when construction commences and when construction is 90 percent complete.
6. The Applicant shall not exceed the number of estimated construction or operation employees by more than 10 percent without amending the permit pursuant to Section 12 of the ISA Rules and Regulations.
7. The Applicant shall work closely with the County Commissioners of Sweetwater County to mitigate unforeseen impacts if they occur. The Applicant will monitor medical personnel in relationship to needs during the construction period.
8. The Applicant will guarantee \$1.2 million of new revenue to the City of Rock Springs during the construction period. Most or all of this new revenue will be in the form of special impact assistance payments from the State of Wyoming. In the event the special impact assistance revenues are less than the projected \$1.2 million, the Applicant will make up the difference. The Applicant and the City of Rock Springs will agree prior to construction on the annual distribution of the guarantee during the construction period.
9. Chevron shall ensure adequate housing for project construction workers, supervisory personnel, and permanent employees. This shall be done in a manner that avoids tightening the local housing market to the extent that housing is unavailable to other residents in the community. The housing plan will include an expanded construction camp, mobile home pads, and recreational vehicle spaces. Before existing housing is used, it must be demonstrated to the ISA that existing and anticipated housing supplies are adequate to provide Chevron required housing and meet secondary demands as well.
10. The Applicant will work closely with officials of School Districts 1 and 2 and will monitor the number of project-related students enrolled in each District during the construction period. If unexpected, adverse impacts occur as a result of the Chevron project, the Applicant will work out a mitigation program to the satisfaction of the appropriate School District, or the question may be referred to the Industrial Siting Commission (ISC).
11. Chevron will construct turn lanes, acceleration/deceleration lanes, and through traffic lanes at the Highway 430/Chevron Phosphate Project plant site access intersection to alleviate potential transportation congestion and safety hazards. The Applicant will continue to work closely with the Wyoming Highway Department to mitigate any problems which might develop at either the plant intersection or the Highway 430 belt route. The Applicant will work closely with the County Engineer in the analysis, planning, and construction of County Road 4-27. Disagreements between the Applicant and the Highway Department or the County Engineer may be referred to the ISC.
12. The Applicant shall develop a two-level monitoring system to determine the direct project-related impacts on affected communities in the area of site influence. Project-related data will be gathered on new employees. In addition, community-specific data on select public services, school enrollments, housing stock, and housing availability will be compiled on a quarterly basis. If monitoring indicates significant deviations from the projected new project-related

ISA PERMIT CONDITIONS

impact, monitoring of other socioeconomic indices will be triggered to the extent they may be applicable to the problem. The Phase II variables will include revenue and expenditures, medical services and personnel recruitment, human services, capital facilities/personnel, and banking and availability of credit. Monitoring will be carried out in close cooperation with the Sweetwater County Association of Government's monitoring program and with the City of Rock Springs' planning office. Reports will be published on a quarterly basis until commercial production levels are reached at the phosphate fertilizer plant.

13. The Applicant will take reasonable action to obtain qualified workers from the local area and dissuade large numbers of job seekers from coming to the local area.
14. If adverse socioeconomic impacts occur which have not been predicted and for which no mitigation plan is in place and which are the direct result of the proposed project, the matter may be referred to the ISC for resolution, if it has not been resolved by community and Company officials. The ISC may require mitigative assistance from the project only if no alternative funding is available.
15. Because construction of the project may be delayed for a period of time from the schedule set forth in its application, the Applicant shall take the following actions to ensure that socioeconomic impacts are adequately mitigated.
 - a. As soon as possible, but no later than 120 days before construction, the Applicant shall notify the ISA of its proposed construction schedule.
 - b. At the time of notification, the Applicant shall consult with ISA to determine whether any socioeconomic conditions must be reevaluated and mitigation plans adjusted because of significant changes in socioeconomic conditions.
 - c. No later than 60 days before construction, the Applicant shall have completed, and provided to ISA for review, any required reevaluation of socioeconomic conditions and proposed adjustments to the mitigation plans.

- d. As soon as practical, but before construction, the Applicant shall, pursuant to Section 12.b of the ISA Rules and Regulations, request an amendment of its permit by presenting to the ISC its proposed construction schedule and any reevaluation of socioeconomic conditions and adjustments of mitigation plans, and
- e. A public hearing will be held if determined appropriate by ISC in accordance with Section 12/b provided, however, the ISC shall undertake all reasonable steps to schedule the hearing, if required, so as not to delay construction of the project.

Phase I

(Variables will be monitored for Sweetwater County, Rock Springs, Green River, and School Districts 1 and 2, where appropriate.)

A. ECONOMIC AND DEMOGRAPHIC CONDITIONS

1. Chevron Chemical Phosphate Project employment and associated characteristics:
 - a. Occupation
 - b. Age
 - c. Sex
 - d. Marital Status
 - e. Residence of family
 - f. Number of children and ages
 - g. Local residence and mode of travel (commuting patterns)
 - h. Type of residence
 - i. Anticipated length of residence
 - j. Length of residence in the area
 - k. Previous residence
 - l. Employee turnover
 - m. Future personnel requirements
2. Other basic employment
3. Secondary employment

B. HOUSING

1. Occupancy rates for housing, by type
2. Number of units available by location and type
3. Requests for housing
4. Vacancies in the existing housing stock and local housing conditions

APPENDIX 3

C. PUBLIC SERVICES

1. Education
 - a. Total enrollments
 - b. Project-related enrollments
 - c. Student-teacher ratios
 - d. Facilities capacity
 - e. Budgetary status
2. Public Safety
 - a. Number of arrests, by category
 - b. Number of fire calls, by type and fire station
 - c. Number of ambulance calls
3. Revenue and Expenditures
 - a. Sales and use tax (total and project-related)
 - b. Impact assistance tax
 - c. Budgetary status
4. Health and Social Services
 - a. Department of Public Assistance and Social Services
 - (1) Service caseloads
 - (2) Intakes on income maintenance
 - (3) Day care facilities and rates of use
 - b. Mental Health Center
 - (1) Total number of incidences of treatment
 - (2) Caseloads
 - (3) Number of project-related cases
 - (4) Number of crisis-oriented cases
 - (5) Number of substance abuse cases
 - c. Health Care
 - (1) Hospital
 - (a) occupancy rate
 - (b) need for allied health professionals
 - (2) Physician Recruitment program
5. Game and Fish Management
Number of violations, by type

Phase II

(Variables will be monitored if Phase I monitoring indicates significant problems in any area; one or more of the following variables may be monitored to the extent that they may be applicable to the problem.)

A. HUMAN SERVICES

The Company would check with the following services on a quarterly basis for any adverse impact:

1. Job Service
2. Probation and Parole
3. Sweetwater County Task Force on Sexual Assault
4. Southwest Wyoming Rehabilitation Center
5. Sweetwater County Child Development Center
6. YWCA (Young Women's Christian Association)
7. Vocational Rehabilitation
8. Southwest Wyoming Alcoholism Rehabilitation Association
9. Family Planning/Western Wyoming Women's Resource Center
10. Volunteer Information and Referral Service
(The analysis would include the following: Service volume by program, full-time personnel available per program, budget, and adequacy of space and facilities.)

B. REVENUE AND EXPENDITURES

(In Phase II, a more in-depth revenue and expenditures analysis will be taken for the political entity adversely affected as indicated by Phase I monitoring. In addition to information collected in Phase I, the following information will be collected.)

1. Per capita operating and capital expenses
2. Bond capacity
3. Total grants and state or federal funds received

C. BANKING

Availability of home mortgage money and interest rates

APPENDIX 4
LAND STATUS AND OWNERSHIP BY MILEPOST

TABLE A4-1
PROPOSED ACTION

Milepost	Distance (Miles)	Land Ownership, Management, or Status
0.0	0.5	0.5 BLM
0.5	1.5	1.0 Private
1.5	3.6	2.1 BLM
3.6	4.7	1.1 Private
4.7	4.9	0.2 BLM
4.9	5.9	1.0 Private
5.9	7.0	1.1 BLM *
7.0	7.3	0.3 Private
7.3	8.1	0.8 BLM
8.1	9.2	1.1 Private
9.2	9.7	0.5 BLM *
9.7	10.3	0.6 Private
10.3	11.4	1.1 BLM *
11.4	12.4	1.0 Private
12.4	13.4	1.0 BLM
13.4	13.6	0.2 Fish & Wildlife Service
13.6	14.2	0.6 Private
14.2	14.6	0.4 BLM
14.6	15.3	0.7 Private
15.3	15.5	0.2 Fish & Wildlife Service
15.5	16.5	1.0 BLM *
16.5	17.6	1.1 Private
17.6	17.7	0.1 BLM *
17.7	18.8	1.1 Private
18.8	19.9	1.1 BLM *
19.9	20.9	1.0 Private
20.9	21.0	0.1 BLM *
21.0	22.2	1.2 Private
22.2	22.8	0.6 BLM *
22.8	23.5	0.7 Private
23.5	25.9	2.4 BLM *
25.9	26.4	0.5 Private
26.4	27.1	0.7 BLM *
27.1	28.2	1.1 Private
28.2	28.3	0.1 BLM *
28.3	29.4	1.1 Private
29.4	30.3	0.9 BLM
30.3	30.6	0.3 Private
30.6	31.7	1.1 BLM
31.7	32.0	0.3 Private
32.0	32.9	0.9 BLM
32.9	34.0	1.1 Private
34.0	34.1	0.1 BLM
34.1	35.1	1.0 Private
35.1	36.3	1.2 BLM *
36.3	37.3	1.0 Private

LAND STATUS AND OWNERSHIP

TABLE A4-1—(Continued)
PROPOSED ACTION

Milepost		Distance (Miles)	Land Ownership, Management, or Status
37.3	37.7	0.4	State of Wyoming
37.7	38.1	0.4	Private
38.1	38.3	0.2	State of Wyoming
38.3	39.4	1.1	Private
39.4	39.6	0.2	BLM
39.6	40.6	1.0	Private
40.6	41.7	1.1	BLM
41.7	46.4	4.7	Private
46.4	47.5	1.1	BLM
47.5	48.1	0.6	Private
48.1	49.3	1.2	BLM
49.3	49.7	0.4	Private
49.7	50.2	0.5	BLM *
50.2	50.8	0.6	BLM
50.8	51.8	1.0	Private
51.8	52.8	1.0	BLM
52.8	53.5	0.7	Private
53.5	53.9	0.4	BLM
53.9	55.0	1.1	Private
55.0	56.0	1.0	BLM
56.0	57.0	1.0	Private
57.0	58.0	1.0	BLM
58.0	59.3	1.3	Private
59.3	60.6	1.3	BLM
60.6	61.3	0.7	Private
61.3	63.6	2.3	BLM
63.6	64.8	1.2	Private
64.8	65.8	1.0	BLM
65.8	66.8	1.0	Private
66.8	67.6	0.8	BLM
67.6	68.0	0.4	Private
68.0	70.4	2.4	BLM
70.4	72.4	2.0	Private
72.4	92.6	20.2	BLM
92.6	93.2	0.6	Private
93.2	93.8	0.6	BLM
93.8	94.5	0.7	UDWR
94.5	97.5	3.0	BLM
97.5	98.4	0.9	Private
98.4	98.5	0.1	BLM
98.5	99.6	1.1	State of Utah
99.6	102.1	2.5	BLM
102.1	102.3	0.2	BLM *
102.3	102.8	0.5	BLM
102.8	103.1	0.3	Private
103.1	108.9	5.8	UDWR
108.9	109.9	1.0	BLM
109.9	110.3	0.4	UDWR
110.3	110.8	0.5	State of Utah
110.8	111.7	0.9	BLM
111.7	119.3	7.6	UDWR

LAND STATUS AND OWNERSHIP

*TABLE A4-1—(Concluded)
PROPOSED ACTION*

Milepost		Distance (Miles)	Land Ownership, Management, or Status
119.3	122.4	3.1	BLM
122.4	128.3	5.9	Private
128.3	131.3	3.0	BLM
131.3	132.4	1.1	State of Utah
132.4	134.7	2.3	BLM
134.7	135.7	1.0	State of Utah
135.7	141.0	5.3	BLM
141.0	141.3	0.3	State of Utah
141.3	142.2	0.9	BLM *
142.2	143.2	1.0	Private
143.2	143.3	0.1	BLM *
143.3	145.0	1.7	Private
145.0	147.8	2.8	BLM
147.8	149.2	1.4	State of Utah
149.2	151.0	1.8	BLM
151.0	151.2	0.2	Private
151.2	152.5	1.3	BLM
152.5	152.9	0.4	State of Utah
152.9	154.2	1.3	BLM
154.2	155.3	1.1	Private
155.3	155.4	0.1	BLM
155.4	156.0	0.6	Private
156.0	158.4	2.4	BLM
158.4	158.8	0.4	State of Utah
158.8	173.2	14.4	BLM
173.2	175.6	2.4	Private
175.6	175.9	0.3	BLM
175.9	176.0	0.1	Private

* indicates Bureau of Reclamation withdrawal; land withdrawn from other uses.

UDWR = Utah Division of Wildlife Resources

BLM = Bureau of Land Management

LAND STATUS AND OWNERSHIP

*TABLE A4-2
SAND WASH ALTERNATIVE*

Milepost	Distance (Miles)	Land Ownership, Management, or Status
0.0	0.5	0.5 BLM
0.5	1.5	1.0 Private
1.5	3.6	2.1 BLM
3.6	4.7	1.1 Private
4.7	4.9	0.2 BLM
4.9	5.9	1.0 Private
5.9	7.0	1.1 BLM *
7.0	7.3	0.3 Private
7.3	8.1	0.8 BLM
8.1	9.2	1.1 Private
9.2	9.7	0.5 BLM *
9.7	10.3	0.6 Private
10.3	11.4	1.1 BLM *
11.4	12.4	1.0 Private
12.4	13.4	1.0 BLM *
13.4	13.6	0.2 Fish & Wildlife Service
13.6	14.2	0.6 Private
14.2	14.6	0.4 BLM *
14.6	15.3	0.7 Private
15.3	15.5	0.2 Fish & Wildlife Service
15.5	16.5	1.0 BLM *
16.5	17.6	1.1 Private
17.6	17.7	0.1 BLM *
17.7	18.8	1.1 Private
18.8	19.9	1.1 BLM *
19.9	20.9	1.0 Private
20.9	21.0	0.1 BLM *
21.0	22.2	1.2 Private
22.2	22.8	0.6 BLM *
22.8	23.5	0.7 Private
23.5	25.9	2.4 BLM *
25.9	26.4	0.5 Private
26.4	27.1	0.7 BLM *
27.1	28.2	1.1 Private
28.2	28.3	0.1 BLM *
28.3	29.4	1.1 Private
29.4	30.3	0.9 BLM
30.3	30.6	0.3 Private
30.6	31.7	1.1 BLM
31.7	32.0	0.3 Private
32.0	32.9	0.9 BLM
32.9	34.0	1.1 Private
34.0	34.1	0.1 BLM
34.1	35.1	1.0 Private
35.1	36.3	1.2 BLM *
36.3	37.3	1.0 Private
37.3	37.7	0.4 State of Wyoming
37.7	38.1	0.4 Private
38.1	38.3	0.2 State of Wyoming
38.3	39.4	1.1 Private
39.4	39.6	0.2 BLM

LAND STATUS AND OWNERSHIP

TABLE A4-2—(Continued)
SAND WASH ALTERNATIVE

Milepost		Distance (Miles)	Land Ownership, Management, or Status
39.6	40.6	1.0	Private
40.6	41.7	1.1	BLM
41.7	46.4	4.7	Private
46.4	47.5	1.1	BLM
47.5	48.1	0.6	Private
48.1	49.3	1.2	BLM
49.3	49.7	0.4	Private
49.7	50.2	0.5	BLM *
50.2	50.8	0.6	BLM
50.8	51.8	1.0	Private
51.8	52.8	1.0	BLM
52.8	53.5	0.7	Private
53.5	53.9	0.4	BLM
53.9	55.0	1.1	Private
55.0	56.0	1.0	BLM
56.0	57.0	1.0	Private
57.0	58.0	1.0	BLM
58.0	59.3	1.3	Private
59.3	60.6	1.3	BLM
60.6	61.3	0.7	Private
61.3	64.0	2.7	BLM
64.0	64.1	0.1	Private
64.1	65.5	1.4	BLM
65.5	65.8	0.3	Private
65.8	66.8	1.0	BLM
66.8	67.4	0.6	Private
67.4	67.8	0.4	BLM
67.8	68.5	0.7	Private
68.5	68.8	0.3	BLM
68.8	68.9	0.1	Private
68.9	69.8	0.9	BLM
69.8	70.0	0.2	Private
70.0	71.1	1.1	BLM
71.1	71.5	0.4	Private
71.5	72.6	1.1	BLM
72.6	73.6	1.0	Private
73.6	73.7	0.1	BLM
73.7	74.4	0.7	Private
74.4	81.8	7.4	BLM
81.8	82.8	1.0	State of Wyoming
82.8	83.4	0.6	BLM
83.4	84.7	1.3	State of Wyoming
84.7	90.9	6.2	BLM
90.9	91.3	0.4	Private
91.3	93.8	2.5	BLM
93.8	94.4	0.6	State of Wyoming
94.4	113.5	19.1	BLM
113.5	114.6	1.1	State of Wyoming
114.6	117.6	3.0	BLM
117.6	117.8	0.2	Private
117.8	118.4	0.6	BLM

LAND STATUS AND OWNERSHIP

TABLE A4-2—(Concluded)
SAND WASH ALTERNATIVE

Milepost		Distance (Miles)	Land Ownership, Management, or Status
118.4	118.9	0.5	Private
118.9	125.4	6.5	BLM
125.4	126.2	0.8	State of Colorado
126.2	141.0	14.8	BLM
141.0	141.1	0.1	State of Colorado
141.1	150.1	9.0	BLM
150.1	151.9	1.8	State of Colorado
151.9	152.3	0.4	Private
152.3	153.9	1.6	BLM
153.9	154.2	0.3	Private
154.2	154.4	0.2	BLM
154.4	156.0	1.6	Private
156.0	159.0	3.0	BLM
159.0	159.2	0.2	Private
159.2	159.8	0.6	BLM
159.8	160.2	0.4	BLM**
160.2	160.4	0.2	Private
160.4	160.7	0.3	BLM
160.7	163.0	2.3	BLM *
163.0	164.0	1.0	BLM
164.0	170.0	6.0	Private
170.0	170.2	0.2	BLM
170.2	175.2	5.0	Private
175.2	176.4	1.2	State of Colorado
176.4	176.7	0.3	Private
176.7	179.3	2.6	State of Colorado
179.3	182.3	3.0	BLM
182.3	183.6	1.3	State of Colorado
183.6	185.2	1.6	BLM
185.2	185.8	0.6	Private
185.8	187.7	1.9	BLM
187.7	189.3	1.6	Private
189.3	189.6	0.3	BLM
189.6	190.3	0.7	Private
190.3	190.6	0.3	BLM
190.6	191.1	0.5	Private
191.1	191.6	0.5	BLM
191.6	191.9	0.3	Private
191.9	192.8	0.9	BLM
192.8	197.1	4.3	Private
197.1	200.3	3.2	BLM
200.3	200.8	0.5	Private
200.8	201.5	0.7	BLM
201.5	202.3	0.8	State of Colorado
202.3	206.5	4.2	BLM
206.5	211.0	4.5	Private

* indicates Bureau of Reclamation withdrawal; land withdrawn from other uses.

** indicates lands withdrawn for the Federal Power Project 2757 of the Colorado Water Conservation District.

BLM = Bureau of Land Management

APPENDIX 5

SOCIOECONOMICS

This appendix describes the data sources and methods used to analyze the impacts. It is divided into the following sections:

Employment
Personal income and per capita personal income
Population
Local Government Revenue
Impacts of additional oil production
Housing
Infrastructure

In each section the sources of baseline and impacts data and the analytical methods are described for that subject. Short form references are given. Complete references can be found in References Cited.

EMPLOYMENT

Baseline Employment Sources

Sweetwater County: Wyoming Employment Security Commission 1982 annual average (Kimball 1984).
Uintah County: Vernal District Office (Brown 1984).
Moffat, Rio Blanco, and Routt counties: Colorado Division of Employment and Training (1983).

Impacts of CO₂ Pipeline

Peak construction employment: 518, Proposed Action; 556 Sand Wash Alternative.
Secondary employment: construction induced population increase (see Population section) times 0.19 (This factor is derived from other BLM EISs.) It results in a secondary/primary employment ratio of 20 percent, which is reasonable for a short term construction project).
Gravity model allocation: Basic gravity model
Population of each community is divided by travel time from site. The resulting quotients are summed. Percent of that total for each community is calculated.
Modifications for this analysis: Each pipeline spread was divided into three parts, giving reference points at 1/3 and 2/3 the distance of that spread. The model was run at each reference point and the results averaged for each spread, the Rock Springs booster station, and

the Rangely field booster station. Separate model runs for each of these were summed to obtain the final results.

Allocations of less than 5 percent were reallocated to the nearest community having an allocation of 5 percent or more. On a continually moving project, it is assumed that workers would favor larger communities within a reasonable commuting distance.

Based on information from the applicant, it is assumed that 15 percent of the construction work force would camp away from communities. These workers were allocated to counties in proportion to the allocations for Spreads II and III, on which most of the camping would be expected to occur.

A separate gravity model analysis was made for secondary employment, including only those communities to which primary employment was allocated, and using retail sales in place of population.

Impacts of Interrelated Projects (sources):

Exxon Shute Creek development: Exxon Company, USA (1983).
Chevron phosphate project: Western Research Corporation (1984).
Jim Bridger power plant and Western Wyoming Community College: Western Research Corporation (Kimball 1984).

PERSONAL INCOME AND PER CAPITA PERSONAL INCOME

Baseline Personal Income:

U.S. Bureau of Economic Analysis (1983).
(Adjustments made to update 1981 employment and income to 1982.)

Impacts of CO₂ Pipeline and Interrelated Projects:

Employment times average earnings by sector, less social insurance contributions.

Per Capita Personal Income:

Total personal income divided by county population.

POPULATION

Baseline Population Sources:

Sweetwater County, Green River, Rock Springs: Western Research Corporation (Kimball 1984).
Uintah County, Vernal: Vernal District Office (Brown 1984).
Moffat, Rio Blanco, and Routt counties, Craig and Rangely: Colorado Division of Local Government (1983).
Steamboat Springs: 1980 Census population times county growth rate 1980-1982 (U.S. Department of Commerce 1981).

Impacts of CO₂ Pipeline:

Primary workers:
Assumed family size breakdown (source: Western Research Corporation (1984):
56 percent single or married without family present
44 percent married with family present
Assumed average family size: 3.50 (source: 1980 census, average of the affected counties).
Secondary workers: assumed to come from the local labor force.

LOCAL GOVERNMENT REVENUE

Baseline Revenue Sources

Lincoln County and school district: Exxon Company USA 1983.
Sweetwater County and school districts: Chevron Chemical Company (1982a).
Daggett and Uintah counties and school districts: Vernal District Office (Brown 1984).
Rio Blanco and Moffat counties: Colorado Division of Local Government (1983).
Rio Blanco and Moffat county school districts: Colorado Office of the State Auditor (1984).
Baseline for taxes during operation: taxes during construction baseline increased in ratio to population.

Impacts of CO₂ Pipeline

Method: investment cost times assessment rate times mill levy.
Investment cost: Chevron. Pipeline cost divided among jurisdictions in proportion to mileage.
Assessment rate:
Wyoming jurisdictions: Wyoming Department of Revenue (St. Clair 1984).
Utah jurisdictions: Utah Tax Commission (Seiguino 1984).
Colorado jurisdictions: Colorado Division of Property Taxation (1983).
Mill levy:
Lincoln County and school district: Lincoln County Assessor 1984.
Sweetwater County and school districts:
Sweetwater County Assessor (Kourbelas 1984). Utah jurisdictions:
Utah Tax Commission (Seiguino 1984).
Colorado jurisdictions:
Colorado Division of Property Taxation 1983.

Impacts of Interrelated Projects

Chevron Phosphate Project: Chevron Chemical Company (1982a), revised in accordance with Western Research Corporation (1984).
Exxon Shute Creek Development: Exxon Company USA 1983.
No additional property taxes would be charged for the Jim Bridger power plant project (pollution control equipment is not taxed) or the Western Wyoming Community College expansion (because it is a state institution).

IMPACTS OF ADDITIONAL OIL PRODUCTION

Baseline Oil Production Sources

Annual oil production (1982):
United States and Colorado: U.S. Department of Energy 1984.
Rio Blanco County: Colorado Division of Mines (McKee 1984).
Projections of future oil production by state and county are not available.
Population: Colorado Division of Local Government (1983), less population impact.
(Impact would prevent population loss.)
Employment and personal income: increased in ratio to population, less impacts.
Tax revenue (baseline figures are total revenue for each jurisdiction):

United States: U.S. Bureau of Economic Analysis 1984. Colorado: Colorado Department of Revenue (Schwartz 1984).
 Rio Blanco County: Colorado Division of Local Government (1983).
 Rio Blanco County School District 4: Colorado Office of the State Auditor (1984).
 Rio Blanco County and school district baselines increased in ratio to population. That adjustment not made for United States or Colorado because impacts are insignificant.

Federal royalty
 Method: annual oil production impact times percent federal mineral ownership times price times royalty rate times distribution formula.
 Percent federal mineral ownership: Craig District Office (Walsh 1984).
 Price: Colorado Division of Mines (McKee 1984).
 Royalty rates and distribution formula: Minerals Management Service (Valdez 1984).

Impacts

Annual oil production: applicant
 Total production increase: 106 million barrels.
 Annual average: total production increase divided by 24 years (1987-2010).
 Total employment:
 Primary employment (applicant): 108
 Secondary employment: primary employment times 2.58; multiplier is derived from McKean and Weber (undated).
 Population: total employment times 1.89 (Rio Blanco County ratio of population to employment).
 Total personal income: employment times average wages and salaries by sector times Rio Blanco County ratio of total personal income to total wages and salaries.
 Tax revenue:
 Property taxes
 Method: ratio of annual oil production impact to Rio Blanco County oil production (baseline) times Rio Blanco County oil and gas assessed evaluation times mill levy.
 Rio Blanco County oil and gas assessed evaluation and mill levy: Colorado Division of Property Taxation (1983).
 Severence tax
 Method: annual oil production impact times price times tax rate times distribution formula.
 Price and tax rate: Colorado Division of Mines (McKee 1984).
 Distribution formula: Colorado Department of Revenue (Schwartz 1984) and Colorado Division of Commerce and Development (Inman 1984).

HOUSING

Baseline and Impacts of Interrelated Projects

Western Research Corporation (1984).

Impacts of CO₂ Pipeline

Population analysis (impacts of CO₂ pipeline, primary workers).

INFRASTRUCTURE

Method

Population impact times facility standard less present capacity.

Baseline, facility standards, and present capacity

Chevron Chemical Company (1982a).

Impacts of interrelated projects

Based on population impacts.

**APPENDIX 6
ENDANGERED SPECIES
SECTION 7 LIST**

Memorandum from U.S. Fish and Wildlife Service

Biological Opinion (will be available for final EIS)



United States Department of the Interior

FISH AND WILDLIFE SERVICE

ENDANGERED SPECIES OFFICE
1406 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138-1197

IN REPLY REFER TO:

April 6, 1984

MEMORANDUM

TO: Rangely CO2 Project Leader, Division of EIS Services
Bureau of Land Management, Denver, Colorado

FROM: Field Supervisor, Endangered Species Office
U.S. Fish and Wildlife Service, Salt Lake City, Utah

SUBJECT: Exxons' Rangely CO2 pipeline project.

We have reviewed your memorandum of March 16, 1984 concerning Exxon's proposed carbon dioxide pipeline from Opal, Wyoming to Rangely, Colorado.

It appears that listed endangered and threatened species, or species proposed for listing, may occur in the area of influence of this action.

To comply with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies or their designees are required to obtain from the Fish and Wildlife Service (FWS) information concerning any species, listed or proposed to be listed, which may be present in the area of a proposed construction project. Therefore, we are furnishing you the following list of species which may be present in the concerned area:

black-footed ferret	<u>(Mustela nigripes)</u>
whooping crane	<u>(Grus americana)</u>
Colorado squawfish	<u>(Ptychocheilus lucius)</u>
humpback chub	<u>(Gila cypha)</u>
peregrine falcon	<u>(Falco peregrinus)</u>
bald eagle	<u>(Haliaeetus leucocephalus)</u>

In addition to the above mentioned listed species we would like to bring to your attention the following plant species which may be in the vicinity of the proposed project (see 45 FR 82480 and 48 FR 53640):

White River penstemon	<u>(Penstemon albifluvis)</u>
Grahams' penstemon	<u>(Penstemon grahamii)</u>
Barnebys' catseye	<u>(Cryptantha barnebyi)</u>
Yampa Plateau evening primrose	<u>(Oenothera acutissima)</u>

The above four species are not protected under the endangered species act, however, we ask that you consider them in your environmental planning as they are under review for possible listing in future.

Section 7(c) also requires the Federal agency proposing a major Federal action significantly affecting the quality of the human environment to conduct and submit to the FWS a biological assessment to determine the effects of the proposal on listed and proposed species. The biological assessment shall be completed within 180 days after the date on which initiated or a time mutually agreed upon between the agency and the FWS. Before physical modification/alteration of a major Federal action is begun the assessment must be completed. If the biological assessment is not begun within 90 days, you should verify this list with us prior to initiation of your assessment. We do not feel that we can adequately assess the effects of the proposed action on listed and proposed species or critical habitat and proposed critical habitat without a complete assessment. When conducting a biological assessment, you shall, at a minimum:

1. conduct a scientifically sound on-site inspection of the area affected by the action, which must, unless otherwise directed by the FWS, include a detailed survey of the area to determine if listed or proposed species are present or occur seasonally and whether suitable habitat exists within the area for either expanding the existing population or potential reintroduction of populations;
2. interview recognized experts on the species at issue, including those within the Fish and Wildlife Service, state conservation agencies, universities, and others who may have data not yet found in scientific literature;
3. review literature and other scientific data to determine the species' distribution, habitat needs, and other biological requirements;
4. review and analyze the effects of the action on the species, in terms of individuals and populations, including consideration of the cumulative effects of the action on the species and habitat;
5. analyze alternative actions that may provide conservation measures;
6. conduct any studies necessary to fulfill the requirements of (1) through (5) above;
7. review any other relevant information.

The FWS can enter into formal Section 7 consultation only with another Federal agency or its designee. State, county, or any other governmental or private organizations can participate in the consultation process, help prepare information such as the biological assessment, participate in meetings, etc.

After your agency has completed and reviewed the assessment, it is your responsibility to determine if the proposed action "may affect" any of the listed species or critical habitats. You should also determine if the action is likely to jeopardize the continued existence of proposed species or result in the destruction or an adverse modification of any critical habitat proposed for such species. If the determination is "may affect" for listed species you

must request in writing formal consultation from the Field Supervisor, Endangered Species Office, U.S. Fish and Wildlife Service at the address given above. In addition, if you determine that the proposed action is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat, you must confer with the FWS. At this time you should provide this office a copy of the biological assessment and any other relevant information that assisted you in reaching your conclusion. We have a special concern for the timing of construction of the proposed pipeline across the Green River and safety feature incorporated to protect the river system during construction and during the operation of the pipeline. Your attention is also directed to Section 7(d) of the Endangered Species Act, as amended, which underscores the requirement that the Federal agency or the applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which, in effect, would deny the formulation or implementation of reasonable and prudent alternatives regarding their actions on any endangered or threatened species.

We are prepared to assist you whenever you have questions which we may be able to answer. If we can be of further assistance, please advise us.

The FWS representative who will provide you with technical assistance is John L. England of this office (801) 524-4430 or FTS 588-4430.

John L. England
Acting Field Supervisor

APPENDIX 7

RECLAMATION AND EROSION CONTROL PLAN ANALYSIS

In order to achieve successful reclamation and erosion control on lands disturbed by project development and operation, an intensive reclamation program would be required. Important variables within the project area that would strongly affect reclamation success include: (1) climatic conditions (low, erratic precipitation and high winds); (2) soil properties, such as shallow depths, thin surface layers, low inherent fertility, moderate to strong salinity and alkalinity, hard bedrock, piping hazard, and the volumes of rock fragments; (3) strongly sloping to very steep sloping terrain; (4) preconstruction variations in vegetation types and their low densities; (5) livestock grazing control on newly seeded areas; and (6) off-road vehicle traffic control on access roads to minimize off-road land surface disturbance. The reclamation procedures that would be incorporated into Chevron's Construction and Operation Plan are described in Appendix 3.

Soil information from the following soil surveys was used to evaluate potential impacts and would be used by the applicants and authorizing agencies to determine applicable erosion control, reclamation, and revegetation measures:

- (1) Soil Survey of the Green River Area, Wyoming (Wells and Knox 1981)
- (2) Soil Survey of Rio Blanco County Area, Colorado (SCS-BLM 1982)
- (3) Soil Survey of portions of Duchesne and Uintah counties, Utah (SCS-BLM 1979)
- (4) Uintah Soil Survey - Portions of Uintah and Grand counties, Utah (SCS-BLM 1981)
- (5) Soil Survey of Moffat County Area, Colorado (SCS-BLM 1981a)

SOIL GROUPS

Following is a brief description of the soil groups that can be found within the project area.

Soils of the Terraces and Floodplains

This group consists of deep, well-drained to somewhat poorly drained, loamy and sandy loam soils that are located on the nearly level to gently sloping floodplains

of the narrow, elongated, intermittent drainageways. These soils are formed in mixed alluvium derived from sedimentary rock. They are subject to a slight to moderate erosion hazard, and in some areas, a moderate to strong saline and alkaline condition. They are the most productive soils of the area and are used for grazing. These soils occur in areas with an average annual precipitation of less than 9 inches and in areas with 10 to 16 inches average annual precipitation.

Soils of the Rolling Uplands, High Terraces, Alluvial Fans and Plateaus

This group consists of shallow to deep, well-drained, loamy and sandy loam soils that are located on sloping to rolling hills, convex ridges, and plateaus. These soils were formed in mixed materials, weathered from sedimentary and metamorphic rocks, with varying amounts of rock fragments on the surface and varying depth. The shallow and moderately deep soils are located on steeper sloping areas, have low productivity, are sparsely vegetated, and are subject to a moderate to high erosion hazard. These soils are used for limited livestock grazing and wildlife habitat, and occur in areas with an average annual precipitation of less than 9 inches and in areas with 10 to 16 inches average annual precipitation.

Shallow, Steep Sloping Soils and Rock Outcrops

This group contains predominantly shallow to medium deep, well-drained, moderately alkaline, loamy and sandy loam soils that are located on moderately steep to very steep sideslopes and escarpments bordering intermittent drainageways and stream courses. They are sparsely vegetated and subject to high runoff and high erosion hazard (geologic erosion). These soils are used mainly for watershed, wildlife habitat, and very limited livestock grazing, and occur in areas with an average annual precipitation of less than 9 inches and in areas with 10 to 16 inches average annual precipitation.

Moderately Dark Colored Soils of the Plateaus and Side Slopes

This group contains soils that are moderately deep and deep, well-drained, neutral to moderately alkaline, loamy, and clay loam soils that are located on gently

sloping to sloping plateaus. These soils are subject to a slight to moderate erosion hazard. Shallow to moderately deep, loamy soils on strongly sloping to moderately steep side slopes bordering the intermittent drainageways associated with a dendritic drainage pattern are also included in this group. These soils are used for livestock grazing and wildlife habitat, and occur in areas with a higher than average annual precipitation of 14 to 20 inches.

Soils of the Mountains and High Plateaus

This group consists of soils that are mainly shallow and moderately deep, well-drained, slightly acid to mildly alkaline, sandy-loam and loamy soils, and are most commonly located with rocky surface layers and coarse fragments ranging from 15 to 60 percent. These soils are forming in place from metamorphic and sedimentary rock. They are on steep and very steep mountain side slopes and canyon rims. Deep loamy, skeletal soils located on toe slopes and on narrow elongated floodplains are common inclusions. These soils are subject to landslides and moderate to high erosion hazards. They are used mainly for wildlife habitat, limited livestock grazing and watershed, and occur in areas with an annual precipitation range of 12 to 20 inches.

Soils of the Mountain Valleys and Drainageways with 10 to 16 inches Annual Precipitation

This group contains soils that are deep, well-drained, neutral to moderately alkaline, loamy soils located on gently sloping to moderately sloping narrow concave valleys and draws bordered by steep mountain side slopes. They formed in mixed loamy alluvial materials and are productive soils. They are used mainly for grazing and production of native hay. While they are subject to a slight erosion hazard, these soils have a high potential for reclamation and revegetation.

VEGETATION TYPES

Following a brief description of the vegetation type:

Sagebrush-Grass

This vegetation type most commonly occurs on valley bottoms, plateaus, and benches. Sagebrush-grass is characterized by an overstory of sagebrush including antelope bitterbrush and rabbitbrush. The predominant types of sage are big sage (*Artemesia tridenda*), low

sage (*A. arbuscula*), or black sage (*A. nova*). The main understory grasses are western wheatgrass, needlegrass, bluebunch wheatgrass, and Indian ricegrass. Forbs include buckwheat, bluebells, and phloxes. Ground cover ranges from 10 to 25 percent.

This vegetation type provides forage for domestic livestock and wildlife and is commonly used within the project area for livestock grazing. In areas with more than 14 inches average annual precipitation (MP 108 to MP 128.3), this vegetation type produces very favorable forage yields.

Pinyon-Juniper

The pinyon-juniper type occurs on the strongly sloping to steep and very steep sideslopes with shallow and rocky soils. Junipers are the major species with some pinyon pine occurring at higher elevations where precipitation is greater. Common species include Utah juniper, Rocky Mountain juniper, pinyon pine, birchleaf mountain mahogany, black sagebrush, big sagebrush, snowberry, western wheatgrass, blue grama grass, Indian ricegrass, buckwheat, lupines, stonecrop, and asters.

Areas containing pinyon-juniper are used for livestock grazing and wildlife. Some pinyon-juniper is used for firewood. *Chaining* has been conducted on this vegetation type on smoother sloping areas.

Greasewood

The greasewood type is generally located on floodplains and low terraces along drainageways of the lower streams and tributaries. Common species include black greasewood, big rabbitbrush, big sagebrush, salt grass, western wheatgrass, seepweed, and saltbush. Ground cover most commonly ranges from 15 to 20 percent. Areas containing greasewood vegetation are used for livestock grazing and wildlife.

Wet Meadow-Riparian Vegetation

The wet meadow-riparian vegetation type occurs mainly in bottomlands and low lying areas of major streams. This type also occurs along the larger tributaries that are poorly drained or receive runoff from adjoining slopes. Riparian communities are generally comprised of cottonwood trees, willows, bluegrasses, sedges, rushes, seepweed, needlegrasses, western wheatgrass, and a variety of forbs.

The riparian zone is one of the highest producers of forage per acre and is important to wildlife. Riparian vegetation stabilizes stream banks, helps protect the quality of stream water, and provides diversity to the area.

Saltbush-Shadscale

The saltbush-shadscale vegetation type occurs on gently sloping to steep, upland areas with shallow to deep, saline and alkaline soils. The most predominant plant species are shadscale, winterfat, Gardners saltbush, black sagebrush, bud sage, birdsfoot sage, needle-and-thread grass, Indian ricegrass, western wheatgrass, alkali sacaton, and squirreltail. This vegetation type is used for livestock grazing (cattle and sheep) and wildlife.

Mountain Shrub

The mountain shrub vegetation type occurs on the moderate to steep slopes at higher elevations with more than 12 inches average annual precipitation and shorter frost-free seasons. The most predominant species include mountain big sagebrush, curlleaf mountain mahogany, snowberry, chokecherry, rabbitbrush, bitterbrush, needle-and-thread grass, western wheatgrass, Indian ricegrass, and forbs such as aster and lupines. Occasionally small patches of aspen occur in the flatter, more moist areas. This vegetation type is used for domestic livestock grazing and is important for wildlife.

ASSUMPTIONS

The analysis of the reclamation and erosion control plan was based on the following assumptions:

1. The requirements identified in Appendix 3 will be stipulated for use on all federal lands involved with this project, and that appropriate compliance procedures will be carried out by the appropriate federal authorized officer.
2. Chevron will further apply the reclamation procedures described in Appendix 3 to private and state lands that would be crossed or otherwise affected by any project component.

RECLAMATION AND EROSION CONTROL ANALYSIS

The reclamation and erosion control procedures (Appendix 3) were developed and evaluated using infor-

mation collected in the soils and vegetation review of the project. The result of the evaluation was the determination that if the procedures were followed and the appropriate monitoring occurred, then the disturbed areas would be successfully revegetated upon completion of the construction phase of the project. The methodology used to complete the evaluation is discussed below.

Soils, vegetation, and climatic information was collected for the surface areas which could be disturbed by the Proposed Action or Sand Wash Alternative. Soil surveys were reviewed to identify soil types and terrain strongly affecting construction procedures and revegetation and restoration potential.

The soils data was analyzed and evaluated to identify

areas with soil properties that strongly affect restoration of cropland and revegetation of native rangeland;

areas subject to slides, rockfall, and mass movement;

areas that are susceptible to high wind and water erosion hazards;

effective measures to minimize the effect of soil disturbances caused by construction activities and to control accelerated erosion; areas where erosion and resultant sediment yield would affect water quality.

Soil erosion losses were estimated using the universal soil loss equation (USLE) and the wind erosion equation as applied to construction sites for selected soil areas representing various conditions occurring throughout the proposed project area. Recent developments in the USLE make it a potentially valuable tool for selecting and evaluating conservation practices on areas disturbed by construction activities. The information gained by application of the USLE to selected soil sites was used as a basis for determining appropriate erosion control and revegetation measures and to evaluate the effectiveness of those measures to ensure successful erosion control, revegetation, and restoration.

Selected soils representing significant conditions in the project areas were analyzed. Additional information, consisting of major rangeland management concerns and recommended conservation practices, was obtained from published detailed soil survey reports and the unpublished Uintah County Soil Survey.

The reclamation and erosion control procedures were developed from the procedures outlined above to cover the range of soil and vegetation types, terrain, land uses,

RECLAMATION—EROSION CONTROL ANALYSIS

and climatic conditions. A detailed construction and erosion control plan will be developed prior to construction including locally recommended techniques and measures tailored to the conditions encountered. Proper implementation of the outlined erosion control and revegetation measures would assure successful restoration of land disturbed by project construction activities.

The outlined maintenance and monitoring program would also identify problem areas caused by adverse weather conditions during restoration periods or in small localized areas with adverse soil properties, and would provide corrective measures to ensure erosion control.

REVEGETATION

The six broad vegetation types are a composite of several plant communities and range sites that occur within a particular climatic or physiographic setting. The saltbush and greasewood, located at lower elevations near the Green River and Little Bitter Creek, are composed of salt-tolerant, drought-resistant plants. The plant densities are low, and are located in various areas ranging from barren to 20 percent ground cover in a 7-to 9-inch annual precipitation zone.

Revegetation is difficult in this low precipitation range; however, with timing of seeding and the addition of a mulch, a grass and forb cover can be successfully established within 2 to 5 years. Without a mulch, direct seeding is not recommended.

The pinyon-juniper type, sagebrush-grass, mountain shrub-aspen, and riparian vegetation types occupy different climatic zones but are basically composed of three classes of vegetation—tree species, brush and shrub species, and grass and forb species. Tree species would reseed naturally, but the planting of seedlings would en-

sure a greater degree of success. It would take 20 years for willow and up to 75 years for juniper and pinyon trees to reach full dimensions. Brush and shrub species would reseed naturally sprouting from roots, or could be planted in containers. Approximately 10 to 40 years would be required for full regrowth. Grass and forb species could be reseeded with successful establishment anticipated within 2 to 5 years following reseeding.

Revegetation can be achieved using various techniques; however, from 2 to 5 years would be required to establish seedlings. The degree of success would be determined by the application of techniques and the degree of compliance exercised by the authorizing agency or landowner.

SUMMARY

It is predicted that successful erosion control, reclamation, and revegetation generally would be achieved throughout the project area provided that Chevron implements effective measures and procedures tailored to the kind of land disturbance and to the conditions encountered. It is emphasized, however, that in order to ensure reclamation success, a strong compliance program accompanied by an effective monitoring and maintenance program is necessary to ensure that applicable measures are effectively applied and that follow-up measures are carried out. The compliance program would be conducted by the appropriate authorizing agencies and landowners. However, impacts to soils and the potential to produce preconstruction vegetation would be significant if applicable erosion control measures were not implemented due to lack of compliance with approved plans or if adverse weather conditions, mainly heavy rainstorms, occurred during construction before any erosion control measures could be installed.

APPENDIX 8

VISUAL RESOURCE MANAGEMENT METHODOLOGY

The BLM's Visual Resource Management (VRM) system was used to analyze the landscape that the Proposed Action and Sand Wash Alternative would traverse. To compare the visual impacts of the proposed project and alternative, the VRM system was applied to lands managed by the Bureau of Land Management (BLM), as well as other federal, state, local, and private lands.

The following sections describe the VRM system and the BLM contrast rating procedure, as well as how the VRM system was applied to the proposed project. A further explanation of each process may be found by referring to the sources used as a basis for the discussion.

THE BLM VISUAL RESOURCE MANAGEMENT SYSTEM

The VRM system is an analytical process that identifies, sets, and meets the objectives for maintaining scenic values and visual quality (BLM 1978, 1980c). The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. Aesthetic judgments considered extremely subjective were found to have identifiable, consistent qualities that can be described and measured. Whatever the terrain and whoever the observer, perception of visual quality in a landscape seems to be based on three common principles:

- Landscape character
- Influence of form, line, color, and texture
- Visual variety

Landscape character is primarily determined by the four basic visual elements of form, line, color, and texture. Although all four elements are present in every landscape, they exert varying degrees of influence. The stronger the influence exerted by these elements, the more interesting the landscape. The more visual variety in a landscape, the more aesthetically pleasing the landscape. Variety without harmony, however, is unattractive, particularly if alterations (cultural modifications) are made carelessly.

The VRM system involves a four-step process: (1) determining the scenic quality of a landscape; (2) measuring the visual sensitivity of an area; (3) determining the distance zones; and (4) compiling all the information into management classes for guidance in assessing environmental impacts. (See Figure A8-1, for flow diagram.)

SCENIC QUALITY

Scenic quality is perhaps best described as the overall impression retained after driving through, walking through, or flying over an area of land. In the VRM process, rating scenic quality requires a brief description of the existing scenic values in a landscape.

When inventoried, an area is first divided into subunits that appear homogeneous, generally, in terms of landform and vegetation. Each area is then rated by seven key factors: landform, vegetation, water, color, influence of adjacent scenery, scarcity of scenic features within a physiographic region, and cultural modifications. A standardized point system assigns great, some, or little importance to each factor. The values for each category are calculated and, according to total points, three scenic quality classes are determined and mapped:

Class A—Areas that combine the most outstanding characteristics of each rating factor.

Class B—Areas that combine some outstanding features and some that are fairly common to the physiographic region.

Class C—Areas where the features are fairly common to the physiographic region.

Sensitivity Levels

Although landscapes have common elements that can be measured, there is still a subjective dimension to landscape aesthetics. Each viewer brings perceptions formed by individual influences, culture, visual training, familiarity with local geography, and personal values.

To measure regional and individual attitudes in evaluating a landscape, visual sensitivity is determined in two ways:

USE VOLUME

Frequency of travel through an area (by road, trail, and river) and use of an area (for recreation, camping, and events) are tabulated. The area is then assigned a high, medium, or low rating according to predetermined classifications.

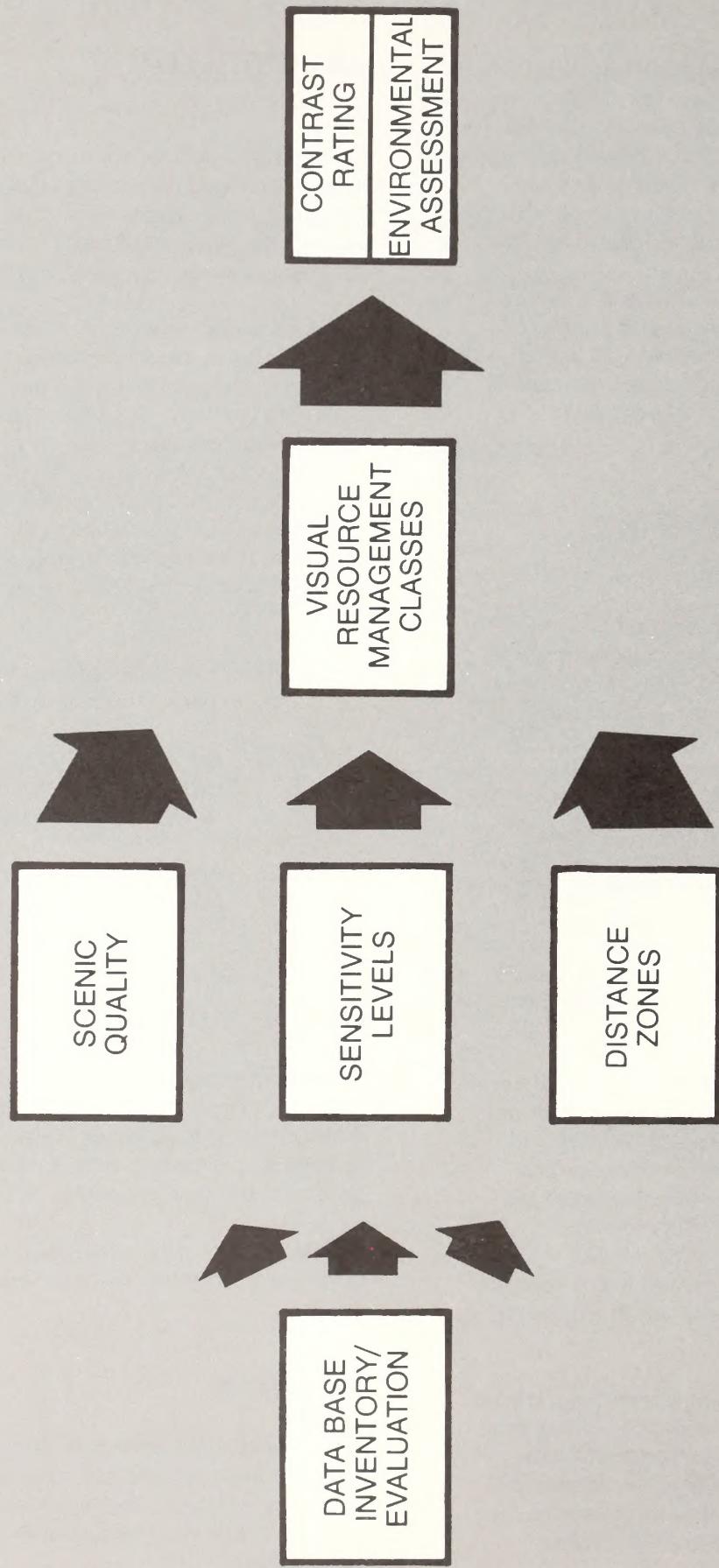


FIGURE A8-1 THE VISUAL RESOURCE MANAGEMENT SYSTEM PROCESS

VISUAL RESOURCE MANAGEMENT METHODOLOGY

USER OR PUBLIC REACTION

Public groups are familiarized with the area (if necessary) and asked to respond to activities that will modify that landscape. The concern they express about proposed changes in scenic quality is also rated high, medium, or low.

The various combinations of use volume and user reaction for each are converted by a matrix to an overall sensitivity rating of high, medium, or low. A map is then developed that illustrates these sensitivity levels.

Distance Zones

The visual quality of a landscape (and user reaction) may be magnified or diminished by the visibility of the landscape from major viewing routes and key observation points.

A landscape scene or 'seen area' can be divided into three basic distance zones: (1) foreground/middleground; (2) background; and (3) seldom-seen. Because areas that are closer have a greater effect on the observer, such areas require more attention than do areas that are farther away. Distance zones allow consideration of the proximity of the observer to the landscape.

Selection of the key viewing points and accurate assessment of distance zones require some judgment. Where several viewing routes exist, what is foreground from one route may be background from another. In that case, the more restrictive designation is used. Atmospheric conditions may also modify the perception of distance.

The process culminates in a final distance zone map.

MANAGEMENT CLASSES

Management classes describe the different degrees of modification allowed to the basic elements of the landscape. Class designations are derived from an overlay technique that combine the maps of scenic quality, sensitivity levels, and distance zones. The overlays are used to identify areas with similar combinations of factors.

These areas are assigned to one of five management classes according to predetermined criteria. The resulting map of contiguous areas sharing the same VRM class is used to assess the visual impact of proposed development.

The five classes are:

Class I. This class provides primarily for natural ecological changes; management activities are to be restricted and are not to attract attention.

Class II. Changes in basic elements by management activities should not be evident in the characteristic landscape.

Class III. Contrasts to the basic elements may be evident and begin to attract attention, but they should remain subordinate to the existing characteristic landscape.

Class IV. Alterations may attract attention but should repeat the form, line, color, and texture characteristics of the landscape.

Class V. Rehabilitation is needed to restore the landscape to the character of the surrounding landscape.

THE BLM VISUAL RESOURCE CONTRAST RATING SYSTEM

The objective of the visual resource contrast rating system is to provide a measure of whether the Proposed Action or alternative will meet the requirements of the assigned VRM classes (BLM 1978 and 1980c). The degree to which a management activity adversely affects the visual quality of a landscape depends on the extent of visual contrasts created between the activity and the existing landscape character. Contrast is measured by separating the landscape into land and water surfaces, vegetation, and structures and then predicting the magnitude of contrast with the basic elements (form, line, color, and texture) for each of these major features. Assessing the degree of contrast will indicate the severity of impact and will guide the plans for mitigating the contrasts to meet the requirements of the VRM classes. Contrasts are considered from the most critical viewpoints for distance, angle of observation, length of time, relative size of the project, season of the year, light, and the effects of time on the healing process.

The following parameters have been applied to determine if the Proposed Action or alternative would meet the requirements of the assigned VRM classes.

Class I. The degree of contrast for any one element may not exceed a weak degree of contrast (1x), and the total contrast rating for any one feature may not exceed 10.

VISUAL RESOURCE MANAGEMENT METHODOLOGY

- Class II.** The degree of contrast for any one element may not exceed a moderate value (2x), and the total contrast rating for any feature may not exceed 12.
- Class III.** The degree of contrast for any one element should not exceed a moderate value (2x), and the total contrast rating for any feature may not exceed 16.
- Class IV.** The total contrast rating for any feature should not exceed 20.

angle of observation, relationship to other views, pipeline and facility locations and construction techniques, ease of revegetation, and proposed restoration methods (Appendix 7, Reclamation and Erosion Control Programs) were considered in analyzing the degree of contrast. In addition, other development in the area was considered where the applicant's project is proposed in order to understand the overall change that might be expected for the affected area (cumulative impacts). The contrast evaluation was concerned with the immediate effects of pipeline construction, such as changed landform, removed vegetation, and finished structures, as well as the long-term effects of the structures, including the microwave system over the life of the project. All impacts were considered to be long term (beyond the life of the project), because of the long period of time needed to lessen the visual contrast with the existing landscape. Short-term impacts, such as the visual presence of work crews, were not considered.

Specific contrasts in form, line, color, and texture indicate problems that could require design mitigation. Applying effective design procedures to the Proposed Action could eliminate or reduce visual contrasts to meet the visual planning objectives stipulated in the VRM class designations. If this were done, the project would be reassessed to determine if it could meet the area's visual goals, and if not, to what degree the landscape's visual resource would be affected.

VRM SYSTEM APPLICATION TO THE RANGELY CO₂ PIPELINE PROJECT

The following section explains how the VRM system was applied to the Rangely CO₂ Pipeline project analysis. The explanations are intended to more thoroughly document how the results of the impact analysis were obtained.

Anticipated areas of landscape modification that would result in high visual contrast if the Proposed Action (or alternative) is to be implemented were evaluated for contrasts. The duration of view, numbers of viewers,

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In order to help the reader locate copies of these references, symbols are used to indicate the following:

- a- Can be inspected at the Bureau of Land Management (BLM), EIS Office, 555 Zang Street, First Floor East, Denver, Colorado 80228
- b- Can be inspected at the BLM District Office, Rock Springs, Wyoming
- c- Can be inspected at the BLM District Office, Vernal, Utah
- d- Available from Chevron USA, Inc. 555 Market Street, San Francisco, California 94105
- e- Available at any public library
- f- Available from the Forest Service, Forest Supervisor's Officer, Ashley National Forest, Vernal, Utah

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Wyoming. See State of Wyoming.

ABBREVIATIONS & ACRONYMS

AADT —annual average daily traffic	mmcf —million cubic feet
AATT —annual average truck traffic	mmcf/d —million cubic feet per day
ACEC —Area of Critical Environmental Concern	MP —milepost
BCF —billion cubic feet	MVA —million volt amps
BLM —Bureau of Land Management, U.S. Department of the Interior	N/A —not applicable
bpd —barrels per day	NAAQS —National Ambient Air Quality Standards
CDOT —Colorado Department of Transportation	NPS —National Park Service, U.S. Department of the Interior
Chevron — Chevron USA, Inc. Chevron USA, Inc. is the applicant for the Rangely CO ₂ Project. Chevron Chemical Company was the applicant for the proposed phosphate slurry pipeline.	ORV —off-road vehicle
CO —Construction and Operation plan	ppm —parts per million
CO₂ —carbon dioxide	PRLA —Preference Right Lease Area
EA —environmental assessment	PSD —prevention of significant deterioration
EIS —Environmental Impact Statement	psi —pounds per square inch
Exxon — Exxon Company, USA. Exxon was the original applicant for this project. Exxon is building the LaBarge gas plant at Shute Creek site.	SCADA —Supervisory Control and Data Acquisition system
FLPMA —Federal Land Policy and Management Act	scf —standard cubic feet.
FS —Forest Service, U.S. Department of Agriculture	scfd —standard cubic feet per day.
GPO —Government Printing Office	SHPO —State Historic Preservation Office
H₂S —hydrogen sulfide	UDOT —Utah Department of Transportation
ISA —State of Wyoming, Office of Industrial Siting Administration	µg/m³ —micrograms per cubic meter
kV —kilovolt	USGS —Geological Survey, U.S. Department of the Interior
MAPCO —Mid-America Pipeline Company	USLE —Universal Soil Loss Equation
mcf —thousand cubic feet	VMT —vehicle miles traveled
mcf/d —thousand cubic feet per day	VRM —Visual Resource Management
MFP —Management Framework Plan	WAG —water alternating with gas
MLRA —major land resource area	WDOT —Wyoming Department of Transportation
	WSA —Wilderness Study Area

GLOSSARY

ANIMAL UNIT MONTH (AUM)—The amount of forage required to sustain the equivalent of 1 cow or 6.2 sheep for 1 month; 5.8 deer for 1 month; 9.6 antelope for 1 month; 5.5 bighorn sheep for 1 month; or 2.2 burros for 1 month (usually 800 lbs. of usable air-dried forage).

ACRE-FEET—The quantity of water that will cover 1 acre of land 1 foot deep; equivalent to 325,850 gallons.

ALLUVIAL FAN—Eroded materials (alluvium) that are deposited at the mouth of a canyon thus forming a fan shape.

ANNUAL AVERAGE DAILY TRAFFIC

(AADT)—The average number of vehicles passing a specified point during a 24-hour period as measured on a yearly basis.

AREA OF CRITICAL ENVIRONMENTAL

CONCERN (ACEC)—An area “within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.” (See 103(a) of FLPMA.) GD

ASPECT (Soils and Vegetation)—The direction that a slope faces.

AUTHORIZED OFFICER—A Federal regulatory agency employee(s) designated responsible for activities involving the use of public lands or delegated to exercise authority with respect to grants for use of these lands.

BACKFILL—Dirt replaced after being excavated during construction.

BEDDING MATERIAL—Materials, most often sand, that are used to protect a pipe from rock irregularities in a trench.

BLOCK VALVE—A valve that can be closed to isolate one section of pipe from an adjacent section.

BUFFERING—Waters containing large amounts of dissolved monocarbonates and bicarbonates of calcium (C_a , CO_3 , and M_g (HCO_3)₂) and the magnesium (M_g CO_3 , and M_g (HCO_3)₂) are considered to be highly buffered. If CO_2 is added to a highly buffered water, some or all of it combines at once with the monocarbonates and forms bicarbonates and tends to

result in the reestablishment of the original equilibrium, and the hydrogen-ions (acidity or alkalinity) concentration tends to remain the same.

CO₂ INJECTION—A secondary recovery technique in which carbon dioxide is injected into old oil wells in a field as part of a recovery program. CO_2 is used in conjunction with water flooding.

CHAINING—A method of increasing forage production by which two bulldozers drag an anchor chain across an area and uproot target plants, particularly pinyon and juniper.

CLAYEY SOIL—A fine-grained soil that has high plasticity containing more than 35 percent clay by weight including mainly clay loams, clays, sandy clay loams and sandy clays.

COFFERDAM—A temporary dam that is used to divert water.

COLLUVIAL—Rock debris and soil accumulated at the foot of a slope.

CONTINENTAL CLIMATE—The climate that is characteristic of the interior of a land mass of continental size. It is marked by large annual, daily, and day-to-day ranges of temperature, low relative humidity, and (generally) by a moderate or small and irregular rainfall. The annual extremes of temperature occur soon after the solstices. In its extreme form a continental climate gives rise to deserts.

CORRIDOR—For purposes of this EIS, a mile-wide strip of land within which a proposed facility would be located.

CRACKING—The process of breaking down certain hydrocarbons into simpler ones with lower boiling points.

CULTURAL RESOURCE INVENTORY CLASSES:

Class I—Existing data inventory: an inventory study of a defined area designed (1) to provide a narrative overview (cultural resource overview) derived from existing cultural resource information, and (2) to provide a compilation of existing cultural resource site record data on which to base the development of the BLM's site record system.

GLOSSARY

Class II—Sampling field inventory: a sample-oriented field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a portion of a defined area in a manner which will allow an objective estimate of the nature and distribution of cultural resources in the entire defined area.

The Class II inventory is a tool to be utilized in management and planning activities as an accurate predictor of cultural resources in the area of consideration. The primary area of consideration for the implementation of a Class II inventory is a planning unit. The secondary area is a specific project in which an intensive field inventory (Class III) is not practical or not necessary.

Class III—Intensive field inventory: an intensive field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a specified area.

Upon completion of such inventories in an area, no further cultural resource inventory work normally is needed. A Class III inventory is appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

DENDRITIC DRAINAGE PATTERN—A drainage pattern whose tributaries branch like a tree.

DISPERSED RECREATION—Camping in undeveloped sites and informal daytime recreation.

ENHANCED OIL RECOVERY—Sophisticated methods for recovering crude oil which go beyond the more conventional secondary recovery techniques of pressure maintenance and water flooding.

FUGITIVE DUST—Airborne particulate matter emitted from any source other than through a stack.

INFRASTRUCTURE—SEE PHYSICAL INFRASTRUCTURE

KILOVOLT (kV)—A unit of potential difference equal to 1,000 volts. Electric power is under pressure which is measured in volts, whereas amperes indicate the numbers of electrons flowing past a point at any given moment; volts indicate the speed at which they travel. Volts times amperes equals watts.

LARVAL FISH—A developmental stage of a fish's life following hatching and lasting until it becomes a free swimming fish, usually when the egg sac is still visible.

LEKS—Areas where grouse gather for ritualistic display and breeding; also sage grouse strutting grounds.

LEVEL-OF-SERVICE—In transportation studies, a qualitative measure of the flow of traffic along a given road in consideration of a wide variety of factors, including speed and travel time, traffic interruptions, and freedom to maneuver. Levels-of-service are designated A through F—A being a free-flow condition with low volumes and high speeds; F being a congested condition of low speeds and stop-and-go traffic. Intermediate levels describe conditions between these extremes.

LEVEL-OF-SERVICE BELOW C—A qualitative measure that approaches unstable to forced traffic flow. It is related to drivers having restricted freedom to select a speed: Traffic stoppages causing down stream congestion.

LITHIC MATERIALS—Stone materials

LITHIC SCATTERS—Evidence of human activity from the Stone culture.

MATS—A steel mesh net used to prevent materials from being thrown during blasting. Also a wooden platform used in sets to support machiney on soft ground.

MICROCLIMATE—The fine climatic structure of the air space which extends from the very surface of the earth to a height where the effects of the immediate character of the underlying surface no longer can be distinguished from the general local climate (mesoclimate or macroclimate).

The microclimate varies with and in turn is superimposed upon the larger-scale conditions. While some rigid limits have been placed on the thickness of the layer concerned, it is more realistic to consider variable thicknesses. Generally, four times the height of surface growth or structures defines the level where microclimatic overtones disappear.

MITIGATION—The abatement or diminution of construction impact to the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, or (5) replacing or providing substitute resources to the environment.

MULCH—Materials such as wood chips or straw on the soil surface to prevent evaporation or erosion or to enrich the soil.

GLOSSARY

NATIONAL AMBIENT AIR QUALITY

STANDARDS (NAAQS)—The allowable concentrations of air pollutants in the ambient air specified by the Federal Government and can be found in Title 40, Code of Federal Regulations, Part 50. The ambient air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety, are requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety, are requisite to protect the public welfare from any unknown or anticipated adverse effects associated with the presence of air pollutants in the ambient air). Welfare is defined as including but not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well being.

NATIONAL REGISTER OF HISTORIC

PLACES—The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation.

NATIONWIDE RIVERS INVENTORY

The Nationwide Rivers Inventory program is a listing being kept by the National Park Service of the best remaining free-flowing rivers in the nation that may be appropriate for protection at the Federal, State, or local level.

NON-ATTAINMENT AREA—A geographic area in which the quality of the air is worse than federal ambient air quality standards.

NOXIOUS PLANTS—Invading plant species with no economic value, often a harmful species.

OFF-ROAD VEHICLE (ORV)—A vehicle (including four-wheel drive vehicles, trail bikes, snowmobiles, etc., but excluding helicopters, fixed-wing aircraft, and boats) capable of traveling off-road over land, water, ice, snow, sand, marshes, etc.

OVERSTORY—The upper canopy or canopies of plants. Usually refers to trees, tall shrubs, and vines.

PHYSICAL INFRASTRUCTURE—Facilities owned by a county, community, or school district that provide services to the people and businesses within that jurisdiction. The facilities analyzed for this EIS are hospitals, park land, water systems, sewer systems, and public school classrooms.

PHYSIOGRAPHIC PROVINCE—An extensive portion of the landscape normally encompassing many hundred of square miles, which portrays similar qualities of soil,

rock, slope, and vegetation of the same geomorphic origin.

PREVENTION OF SIGNIFICANT

DETERIORATION (PSD)—A planning and management process under Sections 160 thru 169 of the CAA for allocation and use of air resources.

REDDS—Excavations or nests in the bottom of a stream where female trout or other fishes will lay eggs. Larvae fishes will remain in a redd until large enough to swim away.

RIPARIAN VEGETATION—Vegetation that grows in and is dependent upon moist or wet soils.

RIPRAP—An erosion control material, generally rock, that is placed on surfaces that are in contact with water.

SCRAPER TRAPS—A device for the insertion or recovery of pigs, or scrapers, that are used to clean the inside surfaces of pipelines.

SHORT-TERM LOSS OF WILDLIFE FORAGE—The time it takes for replanted forage to regrow to pre-existing conditions, but generally less than the life of the project. The time may vary by forage type, i.e. 2-3 years for grass to 20-40 years for browse species such as antelope bitterbrush, mountain mahogany or bigleaf sagebrush.

SPREAD—Construction personnel and equipment required to construct a specific segment of pipeline.

TOPSOIL—The surface tilled layer in cultivated areas or the uppermost layer of soil containing organic materials.

UNDERSTORY—Plants growing beneath the canopy of other plants. Usually refers to grasses, forbs, and low shrubs.

UNITIZED—A term denoting the joint operation of separately owned producing leases by making one of lessees in charge of all functions. Unitizing makes it economically feasible to undertake cycling, pressure maintenance, or secondary recovery programs.

VISUAL RESOURCE MANAGEMENT (VRM)—The planning, design, and implementation of management objectives to provide acceptable levels of visual impacts for all resource management activities.

VISUAL RESOURCE MANAGEMENT (VRM)

CLASS—The degree of visual change that is acceptable within the existing characteristic landscape. It is based upon the physical and sociological characteristics of any

GLOSSARY

given homogeneous area and serves as a management objective.

WATERFLOODING—One method of secondary recovery in which water is injected into an oil reservoir to force additional oil out of the reservoir rock and into the well bores of producing wells.

WILD AND SCENIC RIVERS ACT—Provides for the designation and protection of rivers of national significance if they are free-flowing and contain one or more outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values.

WILDERNESS AREA—An area formally designated by Congress as part of the National Wilderness Preservation System.

WILDERNESS CHARACTERISTICS—The definition contained in section 2(c) of the Wilderness Act (78 Stat. 891).

WILDERNESS STUDY AREA (WSA)—A roadless area or island that has been inventoried and found to have wilderness characteristics as described in section 603 of the FLPMA of 1976 and section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

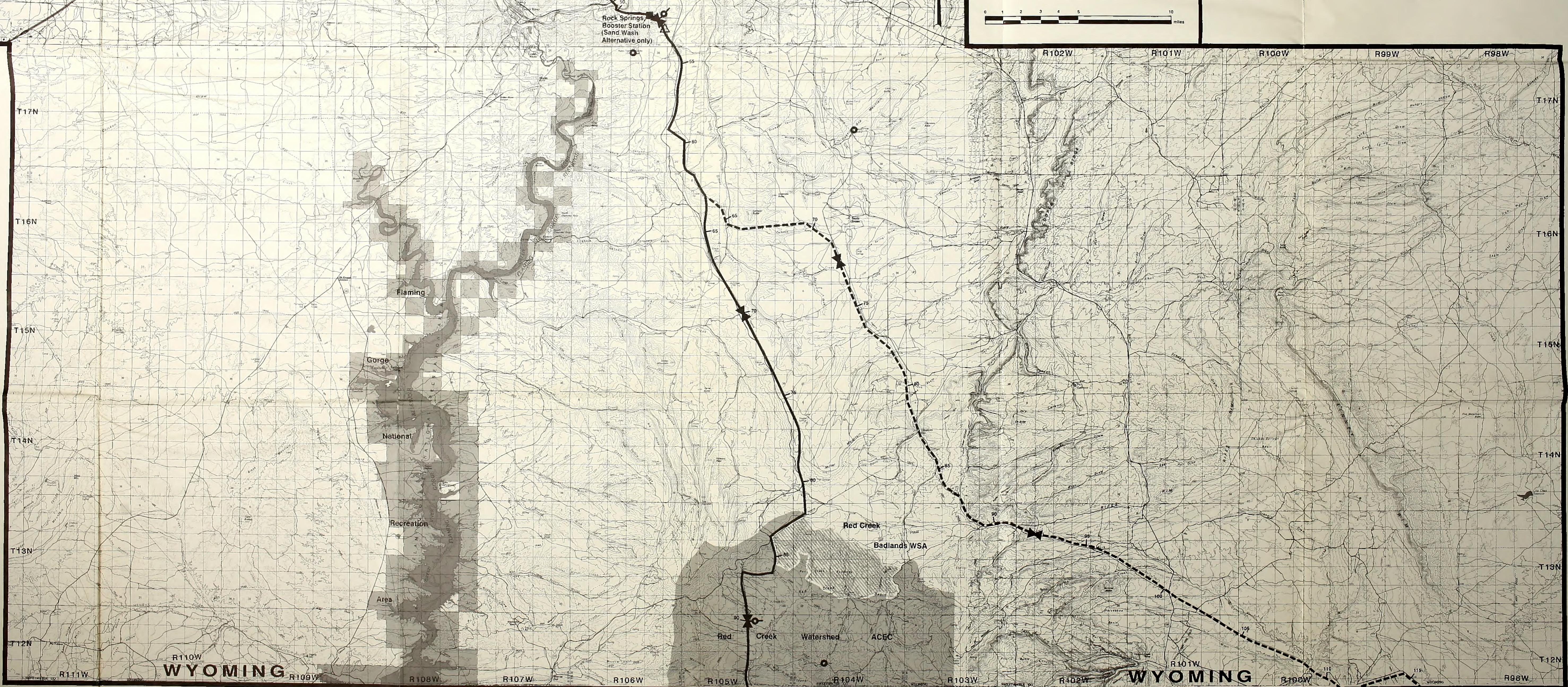
WHOOPING CRANE FOSTER PARENT PROGRAM—Whooping cranes hatched and raised by greater sandhill cranes at Grays Lake National Wildlife Refuge, Idaho by exchanging whooping crane eggs for sandhill crane eggs during incubation.



LEGEND

- Project Facility
- Proposed Action CO₂ Pipeline
- Sand Wash Alternative CO₂ Pipeline
- Block Valve
- SCADA Terminal
- Microwave Site
- Scraper Trap
- Distribution Line
- Milepost

0 1 2 3 4 5 10 miles



MAP A1-1 RANGELY CO₂ PIPELINE PROJECT, NORTH HALF

Rangely CO₂ Pipeline Project Draft EIS (1984)





Rangely CO₂ Pipeline Project Draft EIS (1984)



LEGEND

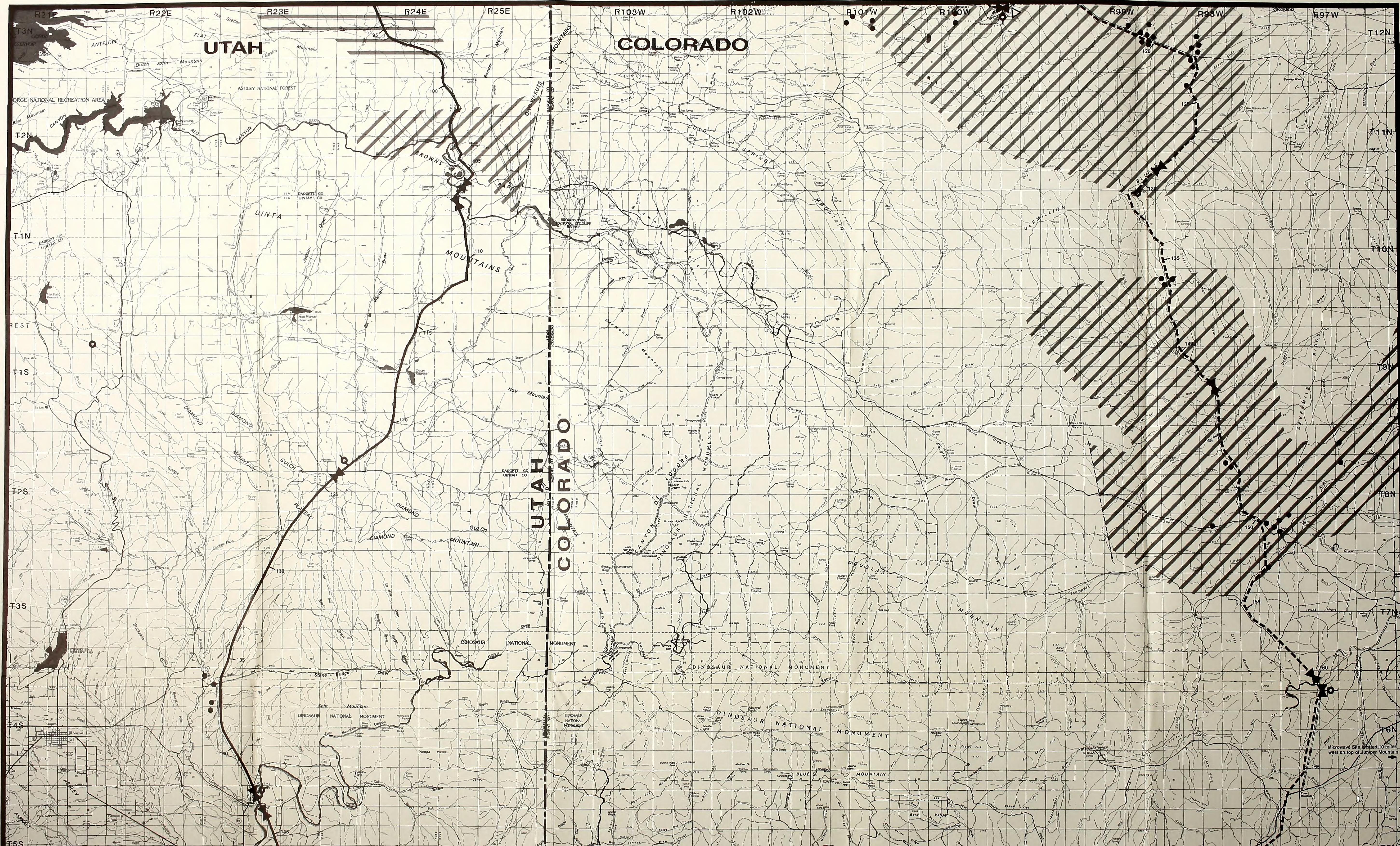
Project Facility	■
Proposed Action CO ₂ Pipeline	—
Sand Wash Alternative CO ₂ Pipeline	- - -
Block Valve	■ □
SCADA Terminal	○
Microwave Site	○
Screeper Trap	△
Distribution Line	—
Milepost	60
Reptor Nests	—
Pronghorn Antelope Winter/Yearlong Range	—
Pronghorn Antelope Winter/Yearlong/Fawning Range	—

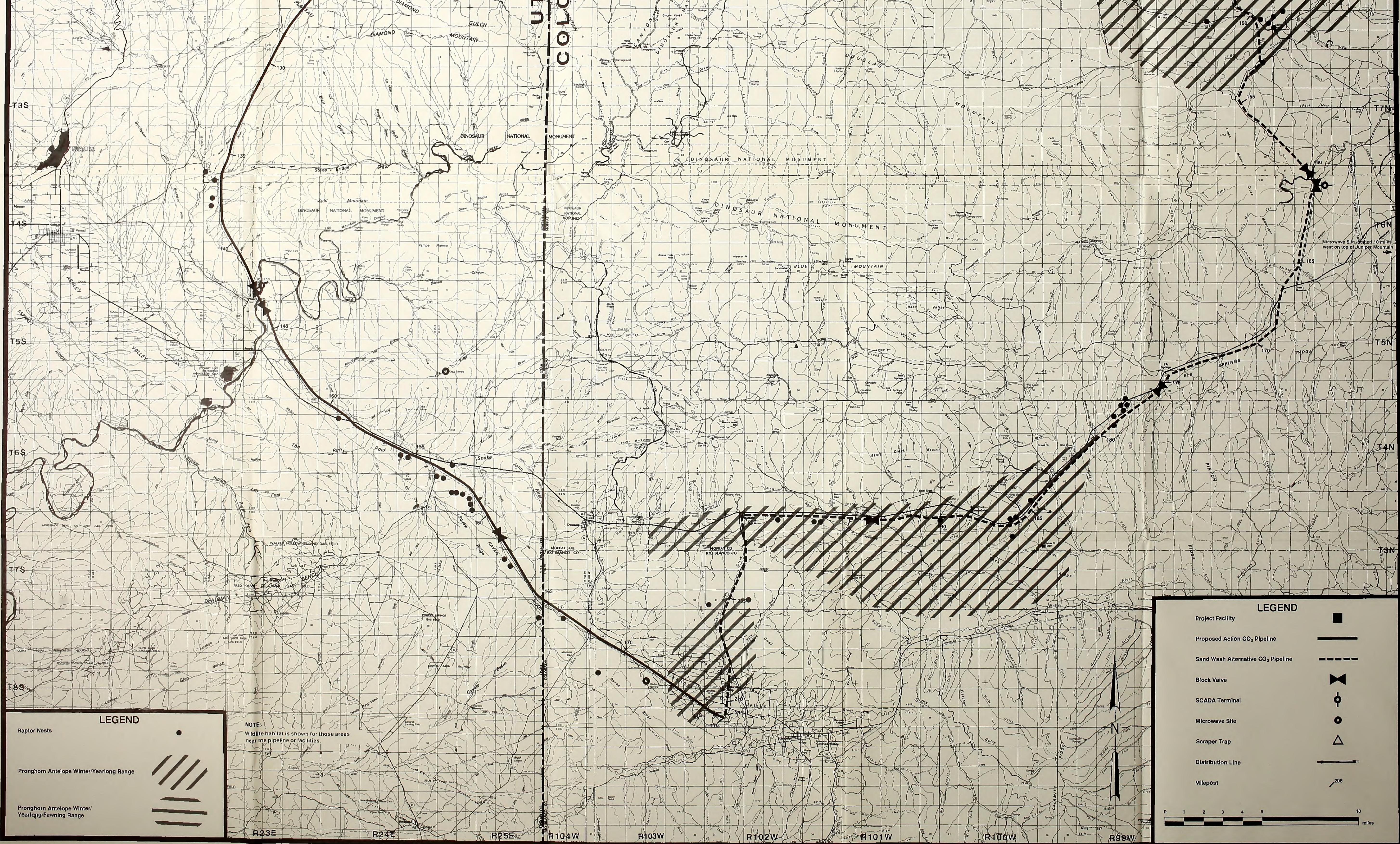


NOTE:
Wildlife habitat is shown for those areas near the pipeline or facilities.



MAP A1-3 RAPTOR NESTS AND PRONGHORN ANTELOPE HABITAT, NORTH HALF





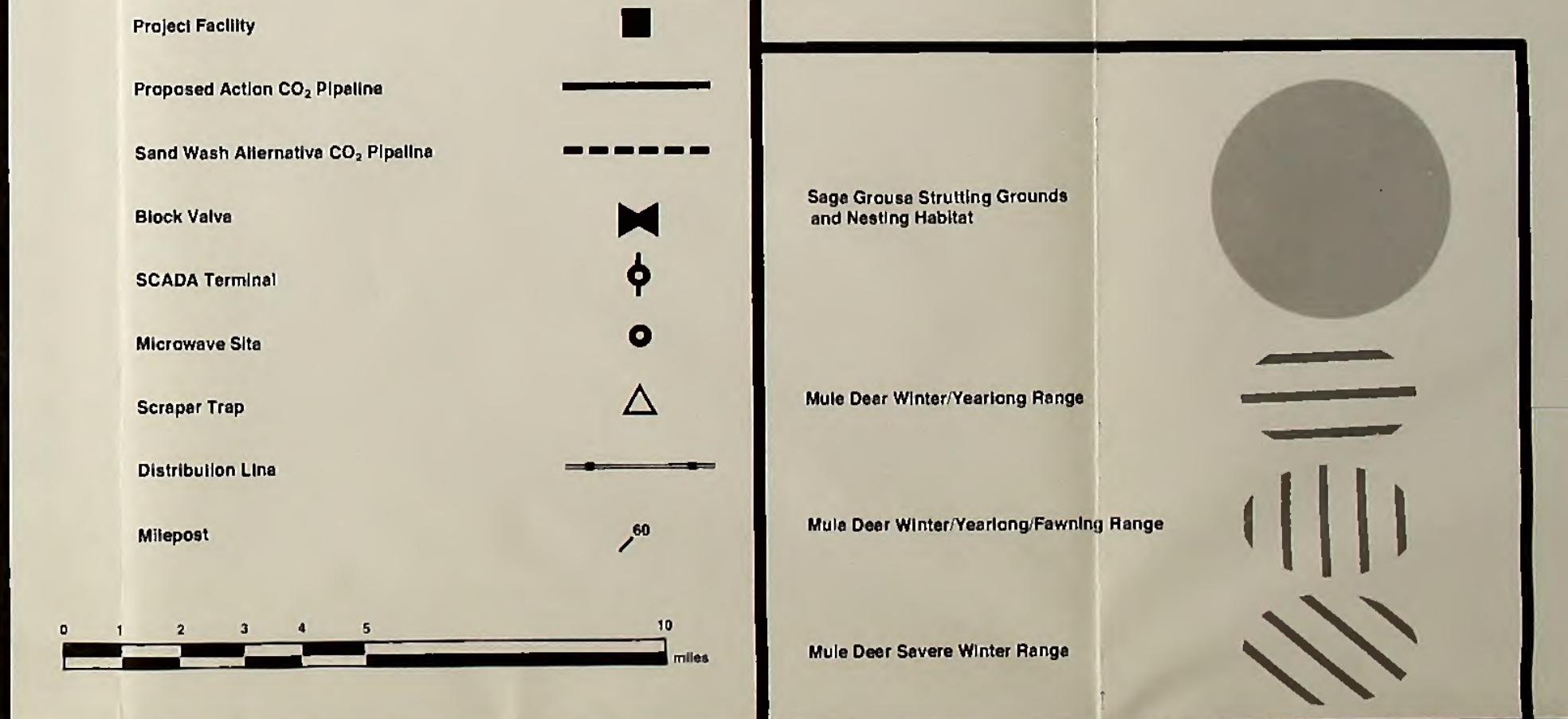
MAP A1-4 RAPTOR NESTS AND PRONGHORN ANTELOPE HABITAT, SOUTH HALF

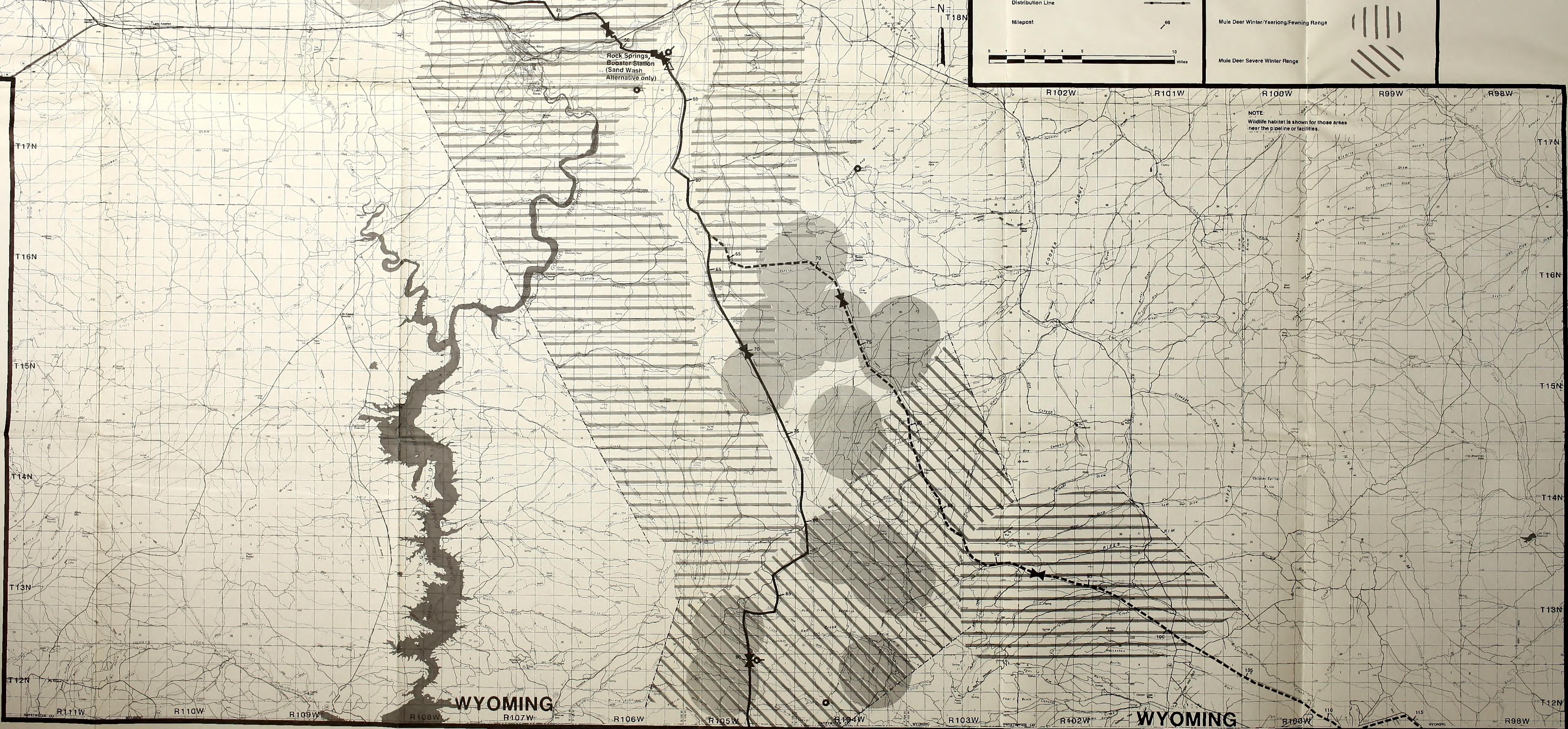
Rangely CO₂ Pipeline Project Draft EIS (1984)

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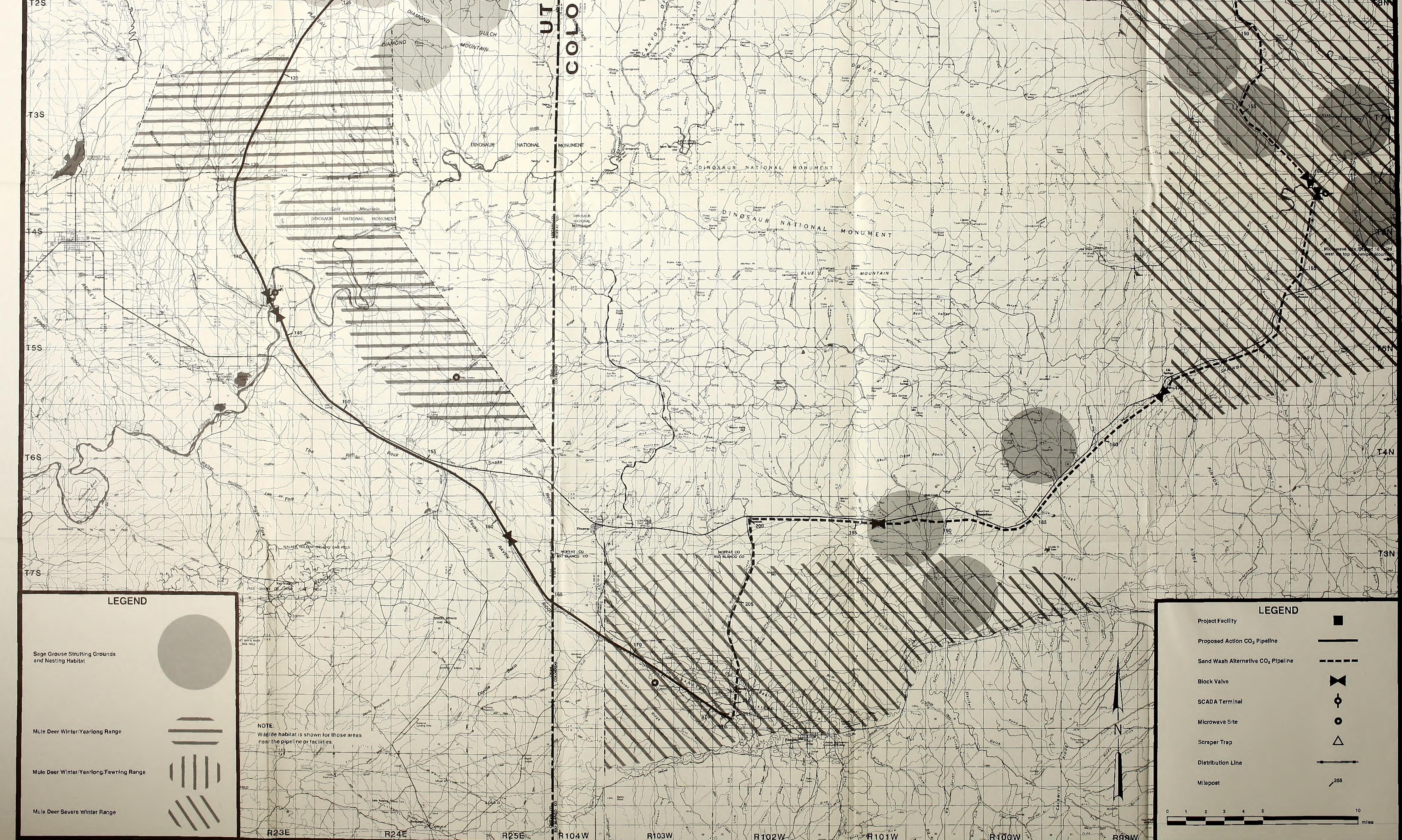
LEGEND





MAP A1-5 MULE DEER AND SAGE GROUSE HABITAT, NORTH HALF





MAP A1-6 MULE DEER AND SAGE GROUSE HABITAT, SOUTH HALF

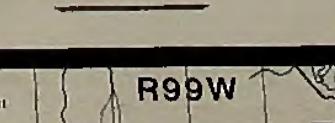
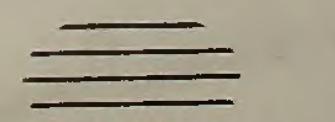
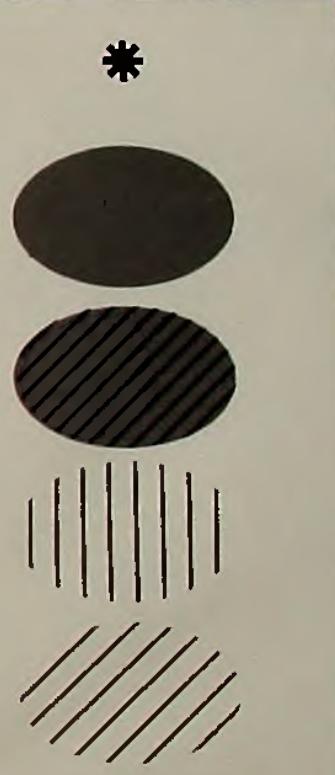
Rangely CO₂ Pipeline Project Draft EIS (1984)

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LEGEND

Project Facility		Black-Footed Ferret Reports
Proposed Action CD ₂ Pipeline		Whitetail Prairie Dog Colony
Sand Wash Alternative CD ₂ Pipeline		Whitetail Prairie Dog Range
Block Valve		Elk Winter/Yearlong Range
SCADA Terminal		Elk Severe Winter Range
Microwave Site		Elk Winter/Yearlong/Calving Range
Scraper Trap		
Distribution Line		
Milepost		



NDTE:

Wildlife habitat is shown for those areas

near the pipeline or facilities.



MAP A1-7 ELK, BLACK-FOOTED FERRET, AND WHITETAIL PRAIRIE DOG HABITAT, NORTH HALF





MAP A1-8 ELK, BLACK-FOOTED FERRET, AND WHITETAIL PRAIRIE DOG HABITAT, SOUTH HALF

Form 1279-3
(June 1984)

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or 100-1000-0000-0000

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